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A National Association of Educational Broadcasters (NAEB) seminar reviewed the development of regional live educational networking and the prospect of a national network to broadcast programs of educational, cultural, and informational interest. Of the 137 operating NAEB radio stations, contributing to the insufficient news communication resources of the nation, 73 responded to a questionnaire on live networking, and 67 expressed degrees of interest in participation. A sample broadcasting schedule was based on the assumptions of an eight hour broadcast day, a general listening audience, and live transmission. Some of the advantages of such a network, programed on a mutual basis with plans for a modified round-robin service, would be improved educational programing, widespread availability, and reduction of station operating costs. Using 13 NAEB stations as a round-robin basic network, the remaining 39 could be fed on a one-way line at a minimum wireline cost of $8569 per month; the equivalent cost for the complete network would be $17,585. As the national network develops through interconnection of regional networks and addition of long-haul telephone circuits, a national headquarters should be established. The report covers discussion generated by each planning division in addition to regional group reports from educational radio stations. (TI)

LIVE
radio
networking

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for
educational
stations

NAEB Seminar
University of Wisconsin
July 17-21, 1960

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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edited by
the seminar planning committee
and betty mckenzie

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NAEB Administrative Vice President Harold E. Hill, chairman of the seminar, welcomed the group on behalf of the NAEB—and stated the purpose of the seminar: to set up a concrete plan or blueprint for a national live educational radio network.

Dr. Fred Harrington, vice president of academic affairs, University of Wisconsin, welcomed the group on behalf of the university.

preface

Starting with the Wisconsin state network several years ago, there has been a growing movement toward the establishment, first, of regional live educational radio networks and, ultimately, a national network. Several steps have been taken in recent months to establish networks in the New England area, the state of Michigan, and the Big Ten area. However, due to several factors, it has been impossible for any realistic planning to be done on a national basis. Those taking the lead in network organization realized that, before any concrete steps could be taken, it would be necessary to bring together educational broadcasters from all over the country to consider necessary, and possible, steps to develop live educational networking.

In view of the above factors, the NAEB Professional Development committee decided to plan, and partially underwrite financially (with funds provided by the W. K. Kellogg Foundation for the operation of NAEB Headquarters), a seminar to be devoted to discussion of present networking endeavors and consideration of future steps. This seminar was held at the University of Wisconsin, July 17-21, 1960.

As a result of discussions there, the group attending the seminar envisions a new, unique, noncommercial radio broadcasting service to the people of the entire country which will provide educational, cultural, informational, and entertainment features of a nature and quality far above anything that has ever been available. By taking advantage of the resources of the institutions of member stations, and as a result of many years of experience in broadcasting by educational radio stations, this appears now to be eminently possible. The proposed network may well enable educational radio broadcasting to fill the role which has been envisioned for it since its inception.

seminar planning committee

Larry Frymire, WKAR, Michigan State University, East Lansing.

Hartford N. Gunn, Jr., WGBH-FM, Boston.

Carl H. Menzer, WSUI, KSUI, State University of Iowa, Iowa City.

Richard F. Vogl, WOI, Iowa State University of Science and Technology, Ames.

Seminar Chairman: Harold E. Hill, NAEB administrative vice president.

conclusions of the seminar

1. The ultimate goal is a national live radio network for educational stations, providing service to the people of the entire country.

2. With that in mind, the NAEB should continue to work NOW toward establishing regional and state networks.

3. The main values of such a network are:
    a. To distribute program materials of a timely nature—news, commentary, and analysis—which are not now readily available to American audiences.
    b. The psychological factor of national live broadcasts versus delayed broadcasts will stimulate participation by faculty and staff of member institutions, and by other authorities.
    c. To serve as a coordinating and distributing agency for the cultural and intellectual resources of the nation.

4. A permanent committee should be appointed to study and work toward establishment of the live network. Membership on the committee should consist of a representative from each NAEB region, plus members of the ad hoc committee which planned the seminar.

5. The NAEB should seek funds for the study of legal and engineering problems related to various types of interconnection in radio broadcasting.

6. At this time it is impossible to establish accurate estimates of staff and budgetary needs of a national network headquarters. Seminar estimates of personnel requirements ranged from six to over thirty. Budget estimates varied from $60,000 to $250,000 per year.

7. The NAEB should seek funds to hold regional meetings throughout the U.S. in order to bring together representatives of all existing or potential network stations. Such meetings will serve to stimulate development of the various regional and state networks which ultimately can be interconnected to form a true nationwide educational radio service.

8. Nonbroadcast uses of a live network would help in financing the network. These uses may be most important in the stimulation of network development by administrators.

9. Network service should span an eight-hour period or more, which will include service for daytime and nighttime programing in most U.S. time zones.

10. A tape program service with air express or other fast handling and delivery capabilities should be established to supplement the present NAEB network service to interconnect the various state or regional networks during the development stages of the national network. This tape service may be continued along with the live network to transmit high fidelity music program features.

11. Regional network headquarters should be set up at a central city in each region. As the national network develops through interconnection of regional networks, a national network headquarters should be established at a location which will best serve the needs of the network.

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keynote address

by

Hartford N. Gunn, Jr.

Wherever we turn these days, we are constantly reminded that we are in the great democratic process of selecting the man who will be President of the United States for the next four years. It will be particularly interesting to note how often we are reminded that we are actually in the process of selecting the leader not only of our own country but of the free world for the next four years. Not many Americans may be aware of this fact, but certainly people of other countries are; for example, some of you may have noted the London newspaper which complained bitterly about our national political conventions, stating, in effect, that while Americans might be willing to involve themselves in such tomfoolery, people in other countries are disturbed at this apparently haphazard system of choosing candidates, one of whom may become president and, in turn, as the major determinant of free world policy and action, the spokesman for their countries.

Regardless of whether the British paper was correct about the nature of our political conventions, it does emphasize the new role of the American presidency. In the final analysis, it is not just a new role for the American presidency, but also for the American citizen, who is now called upon to select a leader not only for himself but for a substantial part of the world. Clearly, this places upon the citizen an enormous burden made nonetheless so by his possible unawareness of its existence. In view of this great responsibility, it seems only fitting that we ask ourselves some of the questions that others are asking about us.

How well prepared is the American citizen to make crucial decisions? Does he have sufficient education? Does he have enough accurate information? Does he have access to the analysis and interpretation of specialists? Is he prepared to choose wisely and to act decisively?

Fortunately, or unfortunately, most high school and college graduates depend upon information supplied by our major communications media such as radio, television, newspapers, and magazines. Of these, radio and television have commanded the major share of attention. How effective have these media been in informing and educating the citizen?

Let us look at several recent events and areas of interest. If reporting is merely the coverage of events, then the American radio and television networks have performed some brilliant jobs of reporting. During Mr. Khrushchev's visit to the United States, Americans were treated to a plane-by-plane, band-by-band, cocktail-by-cocktail description of one of the most interesting and entertaining state visits of the century. Despite the tremendous amount of air time devoted to the trip, interpretation and analysis were almost completely lacking. A great opportunity was totally lost—an opportunity to use this visit as a springboard to place in perspective not just the Russian dictator but the Russian government, its method of operation, its achievements and its failures, the Russian people, and the country itself. With the attention of so many Americans focused on this event, what a shame that no one capitalized on it to provide for American citizens a study in depth of the Soviet system.

Let us look at another area—if there are two cities in the world demanding the most accurate and complete interpretive reporting, they are Washington and Moscow. Granting the limited accessibility of Moscow for such reporting, certainly there can be no excuse for the type of daily reporting which emanates from our own national capital, Washington, D.C. On the program "The Press and the People," Eric Sevareid said: "I don't think that the normal daily fifteen-minute network *television* news programs are successful in terms of content or in giving people understanding. I don't think they ever can be. You'd be better off from fifteen minutes of *radio*, listening to somebody really giving it to you." At this point NBC news commentator Martin Agronsky added: "Let's be specific about it. CBS carries a fifteen-minute show, and ABC carries a fifteen-minute show. Now, in that fifteen minutes, actually how much does Washington get? At the outside, Washington gets two or three minutes. I defy anyone to cover Washington in two or three minutes."

Outside of the United States we find other examples of the lack of broad coverage and interpretation—the booming, bristling continent of Africa, where a new country seems to be born almost every month; yet *no* American radio or television network maintains a regular correspondent who is heard *daily* from that continent. Not long ago, a major American network was enterprising enough to broadcast a BBC correspondent's report from the Congo Republic. He was given *thirty seconds* to explain what was happening. Latin America, too, is slighted in terms of coverage. While events pile up in Cuba, there is virtually no reporting from any of the other Latin-American capitals either on the actions of Cuba and their reactions to them, or on their own national affairs.

These are just a few examples (I am sure that you could suggest many more), but they do indicate the inadequacy of our present system. Clearly, then, we need a communications system that will and can educate our adults to world leadership.

Equally important with national and international understanding in the concept of a new communications system are the areas of job knowledge and cultural enrichment. In almost every phase of American livelihood, particularly among the professions—medicine, law, business, politics, education—the ever-increasing tempo of change is apparent, as is the resultant need to keep abreast of the latest information not only in one's own field of endeavor but in other fields as well. There is also a necessity to help the citizen to a richer life through greater access to culture—music, art, drama, literature—of our own and of other countries.

Another argument in favor of a new communications system has only recently begun to emerge, and that is the need to speed communication within and among the faculties of our educational institutions. As with other professional people, it is important in these times that educators and specialists constantly update and increase their knowledge in their own fields. It seems strange that often we must wait six months to a year for the publication of a scientific paper when an entire conference could be made immediately available to faculty members and experts throughout entire regions by means of a radio network. Educational communication also should be brought to bear on the split between scientists and humanists.

Among others, then, the goals for a new communications system should be: to educate the United States citizen to world leadership, to increase the knowledge and effectiveness of the citizen in his job, to enrich his life, and to perform a special service for education itself.

FAIL TO PERFORM

I don't think it is necessary to labor the point about the failure of our existing systems to perform these services. There simply is not enough being done in enough areas to be satisfactory in the world of today. Further, neither the goals nor the methods of these systems are designed to meet this demand. It is clear that these functions should be performed by some sort of broadcasting system whose primary function is *education*, in both the broad and narrow sense of the word.

One of the first suggestions might be to make use of educational television and, indeed, educational television can and should perform a substantial service in the attainment of these goals. It is well to remember, however, that educational television is usually more difficult and more expensive to use than educational radio. Briefly, then, let us compare the two media.

As we all know, ETV is extremely costly to produce, is often cumbersome and generally lacking in flexibility. Educational radio is relatively inexpensive and has easier and perhaps more frequent access to educational and informational sources. There are relatively few ETV stations as compared with educational radio stations, which are easier to build and to operate. Many of the available television channels are UHF and cannot be received without adapters; thus, they have rather small audiences. For example, while better than 50 per cent of the homes in Washington, D.C., the nation's capital, have FM receivers, there are not more than a handful of UHF receivers that might pick up a future ETV station in Washington. And in comparing radio and television, the interconnection of stations—which is the heart of an adequate communications system—is extremely difficult and costly in ETV.

These comparisons make clear the many advantages of radio as the broadcasting system with which it might be possible to provide the new communications system which modern America demands. However, the individual educational station cannot effect this task alone, for it cannot furnish in depth the educational talent and resources required. It is necessary to have diverse views, to hear from not one but several faculties, from a number of regions and countries, and to hear from not only academicians but also from non-academic people such as government officials in Washington, business leaders in New York or Chicago, industrialists in Detroit or Columbus, and diplomats in the United Nations. All of these talents and resources must be combined and integrated to form the program structure we seek. In brief, we must combine and integrate individual educational radio stations. Thus we come to the possibility of the live, interconnected educational radio network as the most effective means of satisfying the needs for a new communications system within the United States.

But why should the network be live rather than on tape? As one Ford Foundation official asked me the other day, "Isn't most of your material in educational broadcasting timeless?" I had to admit that, yes, a large part of it is timeless, not always by desire but frequently by necessity of tape network distribution. Slow distribution has made it almost impossible to deal adequately with the increasing tempo of national and world events, thereby crippling educational broadcasting in one of the areas where it is most needed.

But, the live, interconnected network has other values besides its ability to deal with the timely, the immediate, and the urgent. It could and should provide more programs than a tape distribution system can. It should, in fact, provide a complete schedule of eighteen hours every day which member stations can accept or reject. And, because it can provide so many programs with ease, flexibility, and relative economy, the network should enable stations to reduce their local program production and to concentrate on a few outstanding programs—better programs not only for the network, but for individual local needs as well. As a by-product of the full network schedule, there may be encouraged the development of new stations by those institutions which previously have been frightened by the prospect of providing a complete program schedule by themselves.

PSYCHOLOGICAL EFFECT IMPORTANT

There is another reason for a live, interconnected radio network. It is the psychological effect. This effect, I think, can be shown by the greater interest of the audience. It may be due to better programing, or due to publicity which becomes possible for the first time with simultaneous distribution, or possibly due to an intangible sense that programs are being heard simultaneously throughout a region or throughout the country. I know that this effect can be felt by our educational institutions and faculties. Again, there is that intangible difference to faculty members between the preparation of a program to be heard immediately by a great number of people and colleagues throughout a wide area—versus being heard sometime during the next six months to a year on one station at a time. Indeed, it is unsettling, particularly to a political scientist—for that matter to any scientist—to realize that his words via slow tape distribution may confront him in some large metropolis six to nine months from now. There is no question in my mind that a live network creates excitement, anticipation, and greater interest for the audience, and for our faculties and institutions.

But I can't help thinking that the greatest effect of all may be upon ourselves, the station managers in such a network. The network will force us to do cooperative thinking and planning concerning the presentation of programs and the use of talent and facilities. This new interaction, coupled with some of the same excitement which our faculty and institutions feel, may result in our coming up with new and better programing and it may indeed result in our thinking and planning in a far greater dimension than we do today.

Let me come back for a moment to the audience, or more correctly, audiences, of such a live educational radio network-for in the final analysis, they are the reason for the existence of such a communications system. We have long known that the audience for our individual educational stations has consisted to a very great extent of the leaders in almost every area of endeavor. Research has proven to many of us that one of the most important things distinguishing our audience from that of any other media is the unusually high proportion of community leaders, scholars, professionals, etc. Let us capitalize on this fact in the development of our live educational radio network. Let us frankly cater to this audience, for it has, in fact, the greatest immediate influence in the world today, both nationally and internationally. It is an audience almost totally unserved by other mass media. This network should provide a unique service in depth, with emphasis on analysis and interpretation of background information, with creative cultural programing, and with specific programs for businessmen, lawyers, doctors, educators. This audience of leaders in every field is the audience which we are best equipped to serve and which needs most the service that we alone can provide.

Well, how far along are we in our network thinking?

There are two parallel movements in the direction of live, interconnected educational radio networks. One is along the eastern seacoast stretching from Montreal to Chapel Hill, North Carolina—an area with a potential audience of over 45 million people. It is expected that the central New England segment will be fully completed this fall. Progress is already under way to establish new stations to interconnect this northeastern group with existing stations in New York; Philadelphia; Richmond, Norfolk, Virginia; and Chapel Hill, North Carolina, as well as with the Canadians through Montreal. The other network under consideration is the midwestern round-robin system designed by Carl Menzer, and utilizing many fine existing stations, to serve Illinois, Iowa, Minnesota, Wisconsin, Michigan, Ohio, Indiana, Missouri, and eventually virtually the entire midwestern U.S.

These two proposed network systems are not far apart from each other. If these two regional networks can be successfully established, there is no question of the possibility of interconnecting within a few years a network stretching from Canada to North Carolina, and from the east coast to beyond the Mississippi. One can only speculate that if such a network were created, it might well be possible to stimulate interest in and a desire for a national coast-to-coast and border-to-border educational radio network.

The need for such a system has been clearly demonstrated. It remains to be seen, however, whether we have the imagination and the capacity to devise the mechanism and to create the programing by which the needs of modern America shall be met.

DISCUSSION

BROWNE: Hartford, you had four objectives listed. Would you repeat those?

GUNN:

1. To educate the United States citizen to world leadership.
2. To increase the knowledge and effectiveness of the citizen in his job.
3. To enrich his life.
4. To perform a special service for education itself.

Now I think all of you could come up with another set of goals, but as I thought this over these were the things that struck me about what this network might do; these seem to be worthy of consideration. You could certainly add or subtract as you wish, but these are four services which should be performed today.

FRYMIRE: What is the status of the New England network now, as of this date?

GUNN: For two years the Albany Medical College in Albany, New York, and we ourselves have been exchanging programs 150 miles across Massachusetts. This fall we will have completed the central Massachusetts station. These three stations alone will cover almost all of southern New England. We're going up from 15 kw to 50 kw. The station in the central part of the state will be also high-powered, located 750 feet above average terrain. The station on Mount Greylock of Albany Medical College is about 2,600 feet above average terrain. There's a favorable report on educational broadcasting going to the trustees of Wesleyan University which would put a station into southern Connecticut which would serve all of Long Island and the area from southern Connecticut to New York City. This will complete the connection with New York. There are already at least three or four NAEB stations in New York so this is the New York-Boston link, finished—hopefully by the spring.

Then we have existing stations in Philadelphia. There are several ways we can get from New York to Philly. They're under exploration. We may use an intermediate station or we may not. There are only eighty miles separating the two cities. It's just a problem of getting interference-free signals in and out of the two cities. There we stop.

We need stations in Baltimore and in Washington and we've been working with people in both of those cities. We've had a series of meetings at Johns Hopkins, with the Baltimore people including, Baltimore Junior College, the University of Maryland, Goucher, and a number of other institutions in that area. They have shown interest, but they have taken no positive action. The Washington group looks as if it will center around American University—which has very extensive studio facilities. They have everything they need except the transmitter and auxiliary equipment, and we're seeing what we can do to provide them with transmitting facilities.

If that happens and we're into Washington we can then feed on to Bob Kirkpatrick's station in Richmond, Virginia. There's no problem in getting from Richmond to Norfolk, where there is an existing station at William and Mary. We have had a conversation with the people at Charlottesville, at the University of Virginia. They have a ten watter. If they take it up to 30 or 40 kw and put it up in the Blue Ridge Mountain area, they'll interconnect with Richmond and carry the signal to within one station of Earl Wynn in Chapel Hill. And Earl Wynn thinks he will be able to make the connection into North Carolina.

Then there are two other needed developments:

1. To try to persuade the University of Vermont to put facilities in northern Vermont which would make the hop from Albany to Montreal. That would complete the interconnection with CBC and, as many of you may know, CBC now has its own FM network which does not duplicate the CBC Trans-Canada network. They're very interested in our system and might take some programs from us and also be willing to feed some programs to us.

2. Then the other question is how do we proceed across to the west. Penn State University is receiving programs from WNYC in New York via one educational station and one commercial station, and we think it may be possible to get from Penn State in central Pennsylvania into Duquesne at Pittsburgh—which would bring us to the Ohio state border.

Or we can come at it another way. We can come out of WAMC in Albany and through one new transmitter at Utica or through one or two relays into Syracuse. From Syracuse it's a short hop to Rochester, and from Rochester a short hop to Buffalo. If we were into Buffalo, we would need only one relay station—at Cleveland. From Cleveland we're into what we hope will be the Ohio state network, and I think the Midwesterners can carry it on from there.

So we're not too far away; we feel that we're better than 50 per cent down the road to making this thing work and making it possible to interconnect with the West—maybe almost simultaneously with the completion of the link to the South.

PAULU: It seems to me that programing is the thing we should consider before we get too far into technical and financial considerations. As I see it, there are two facts which should affect our deliberations: the change in commercial radio as a result of TV, and the coming of TV—both educational and commercial—resulting in the eclipse of educational radio. It is encouraging that Hartford Gunn happens to manage both educational TV and educational radio. And without precipitating an argument as to which is better, I would like for Hartford to explore how each is best used. On the basis of the two points I mentioned and on the basis of the audience to be served, what do you see as the primary programing possibilities of the network?

GUNN: Let me concentrate on one area. I am sure that you will agree that TV has destroyed news commentary, interpretation and analysis. This is a matter of concern not only to us, but to the leading commercial news men such as Murrow, Sevareid, and Agronsky. This is an area which educational broadcasting certainly should be able to fill and fill better than was possible in the days of old radio network service. News coverage as we knew it prior to TV—that is service by all networks—is practically nonexistent today, at least in our area. And the substitute which TV has provided is most inadequate. This is an area where we should be able to perform a very special and unique service. For example, in current events, an educational network could provide needed service. The BBC maintains correspondents in Africa, but our national networks do not. The BBC people have said that if we will put together a network of significant dimensions, they will give serious consideration to purchasing regular time, a half-hour or an hour, on the cable to feed regular programs from London. This would give us access to all the BBC correspondents around the world. The same is true of CBC, which has one of the finest international news services available.

Other sources would include voluntary correspondents in such areas as Ghana, and faculty members of our own institutions who are experts on foreign affairs and who are frequently in other parts of the world where they could serve as correspondents. We might be able to use the BBC permanent lines and short-wave radio to get these programs back.

Another area would be programing aimed at increasing the knowledge and effectiveness of citizens. Among our member institutions, scientific knowledge which is important and which must be disseminated could be sent out over the network, either on a broadcast or closed-circuit basis. Another area, that of enriching the citizen's life, is one we have all been covering for many years. But we have been doing it primarily with our local resources or by using the tape network. This can be greatly expanded on the live network.

Finally, performing a special service for education itself could be handled through multiplexing, while the regular programs continued to be broadcast to the general public. Examples might be bringing together via radio outstanding scientists who might prefer this method to journeying to a conference. A two-channel multiplex system would result in two-way communication. Similarly we might use teletype, facsimile, slow-scan TV, and a number of other possibilities to assist in the transmission of this professional data, and also to provide an administrative communications channel among institutions. This is an entirely new area and perhaps should not be called "broadcasting," but a new "communication system." This is a total system. It is no longer simply broadcasting to the general public.

HARRISON: When you speak of news, are you thinking in terms of spot news or general background?

GUNN: I am thinking in terms of both. In terms of Africa and Latin

America, you are not even getting spot news really. Things have to fall apart before you get it. Even more important is interpretation and analysis which could come from our own faculty, but because of their close association every day their views tend to coincide. The answer to this problem is live network broadcasting. With a network it is possible to put together a 30-minute or 45-minute commentary on world events, switching to a number of people talking on a single topic or on several topics on which they are authorities.

This network would require tremendous coordination between these schools and would include a file of the faculty and the fields in which they were experts.

DREYFUS: How and why does live network broadcasting increase cultural enrichment?

GUNN: It doesn't necessarily. This is not inherent. There are many things which are better on tape, such as BBC music broadcasts. But many things are available from Canada and Britain only on a live basis. A lot less material is available from Canada and Britain than would be available if it could be done on a live basis because of recording and transcription fees.

FRYMIRE: What are some of the other advantages of a live network?

GUNN: It would require joint effort and cooperative program planning would stimulate our own thinking in the United States. There is also the psychological point: If you go to some top man and try to persuade him to come on the radio with a taped program which will go across the country, he will not be overly interested because the program will not reach many areas for a long time—but if you can tell him that at this moment he will talk to people in fifty cities, that makes a difference.

H. HILL: Frank, would you explain the Big Ten network thinking?

SCHOOLEY: There is an organization called "The Council of Ten and the University of Chicago." This is a cooperative venture comparable to the Southern Region Education Board or the similar organization in the Rocky Mountains, both of which by their very nature are tied in with political units of government. Big Ten schools and Chicago decided to do something regionally on a cooperative basis without tying themselves into political organizations, and so they formed this organization.

It exists for the purposes of cooperation and is financed by a Carnegie grant. It has a committee which is made up of the vice presidents or provosts of the 11 institutions. There is also a director and an assistant director.

In thinking about a radio regional network those of us in the organization have transmitted to this cooperative committee of the Big Ten and Chicago a proposal to make a more formalized study of the potential and the operation of a Midwestern network. We have elected to use the machinery which exists but we are not closing the door to expansion to a Midwestern network including more than these eleven institutions. What we have tried to do is to pick up a kind of machinery which exists and which we might tie to, from which we would also get support for the operation of this network. When the time comes this may be expanded. The University of Chicago is presently considering getting a station of its own.

We are thinking at the moment of a live, line-linked network. We are also thinking of holding back one hour for nonbroadcast purposes and perhaps to set up an inter-institutional specialized seminar.

KIRKPATRICK: Do you even vaguely have any target date?

SCHOOLEY: A tentative target date of January 1, for the Big Ten and Chicago. This can be operated at $1,000 per month per institution.

HARRISON: Is this to operate on a round-robin basis?

SCHOOLEY: Yes.

H. HILL: Al Fredette is going to tell us about the two-way radio medical conferences at Albany.

FREDETTE: Under the auspices of the Albany Medical College and through the direct efforts of Dr. Frank Woolsey, the associate dean there, we have developed a unique idea in educational broadcasting. Since it is so difficult to get busy medical men to come to the medical college for much-needed postgraduate education, we decided to try to bring the medical college to them. We secured the services of some eight or nine radio amateurs and one transmitter at the medical school. At the medical school we had two faculty members talk on a given subject and at each of the seven or eight hospital locations where the amateur transmitters and receivers were located, the doctors would address questions directly to the faculty members. Following this experiment, we received a grant of $90,000 from the Rockefeller Foundation, and with these funds, purchased remote broadcast pickup units and built an educational FM station atop Mount Greylock operating at 90.7 mc. Our thirty-two remote broadcast pickup units are operating at 153.11 mc using beamed antennas. These are aimed at the 90.7 mc FM transmitter location on Mount Greylock. Consequently, anything coming from the Albany Medical College via a 941 mc studio transmitter link or from any of our thirty-two remote transmitter locations, goes to Mount Greylock, where it is rebroadcast on our 90.7 mc FM transmitter. Now you have in effect two-way radio communication.

We have expanded so that we now have remote studios in Boston, Massachusetts, in New Haven, Connecticut, and in Burlington, Vermont. Any one of the medical colleges in these cities can present a 15-minute or 20-minute dissertation from its own campus, and allow the remaining portion of the hour to be used so that the physicians in the participating hospitals can ask questions and receive live, on-the-spot answers. We do this three days a week.

Up to now the participation has been limited to eight hospitals per day. This year we are going up to ten hospitals per day for each of three days. The doctors participate in this program during their lunch time; this system saves the participating doctors both time and money. We feel that medicine should not monopolize this system, and we would like to see this developed in the other arts and sciences.

We can't afford TV, but we do use visual aids. We send these on in advance and they are distributed just before the conference. This is much cheaper than TV.

We are expanding. We hope to add the University of Syracuse, the University of Rochester, and Pennsylvania Hospital to the six present collaborating faculty groups.

Another instance of the psychological drawing power of live, two-way radio is the case where our Suburban Scholastic Council, a group of eight progressive high schools asked the lieutenant governor to give a 15-minute talk on the 1960 legislative session just completed. He almost surely would not have consented to speak at any one of these schools, but where we could tell him that he would be speaking to anywhere from 6,000 to 8,000 students, he gladly consented. There were panels set up at each school, and when his talk was completed the students asked questions and received immediate answers. This system is even more effective for a limited group. For instance, consider the idea of having Robert Frost do some readings for English classes, followed by a question-and-answer period.

VOGL: I suppose that since this can be done on a regional basis, it can be done on a national basis?

JANSKY: Yes.

radio network programing

by

Richard F. Vogl

Last September [1959] in Washington, D.C., a three-day conference was held to consider the feasibility and role of state and regional networks in educational broadcasting. The proceedings of that conference were subsequently prepared and published by the NAEB and were distributed to the membership. The book's 257 pages present a concise and up-to-date picture of educational networking, both radio and TV, in the United States today. But one need read only to page 28 to find a statement that might well be adopted as the text for our 1960 seminar on live radio networking. The author is Dr. Louis M. Lyons of Harvard University, and a regular news commentator on WGBH-FM-TV in Boston. In his closing remarks he said:

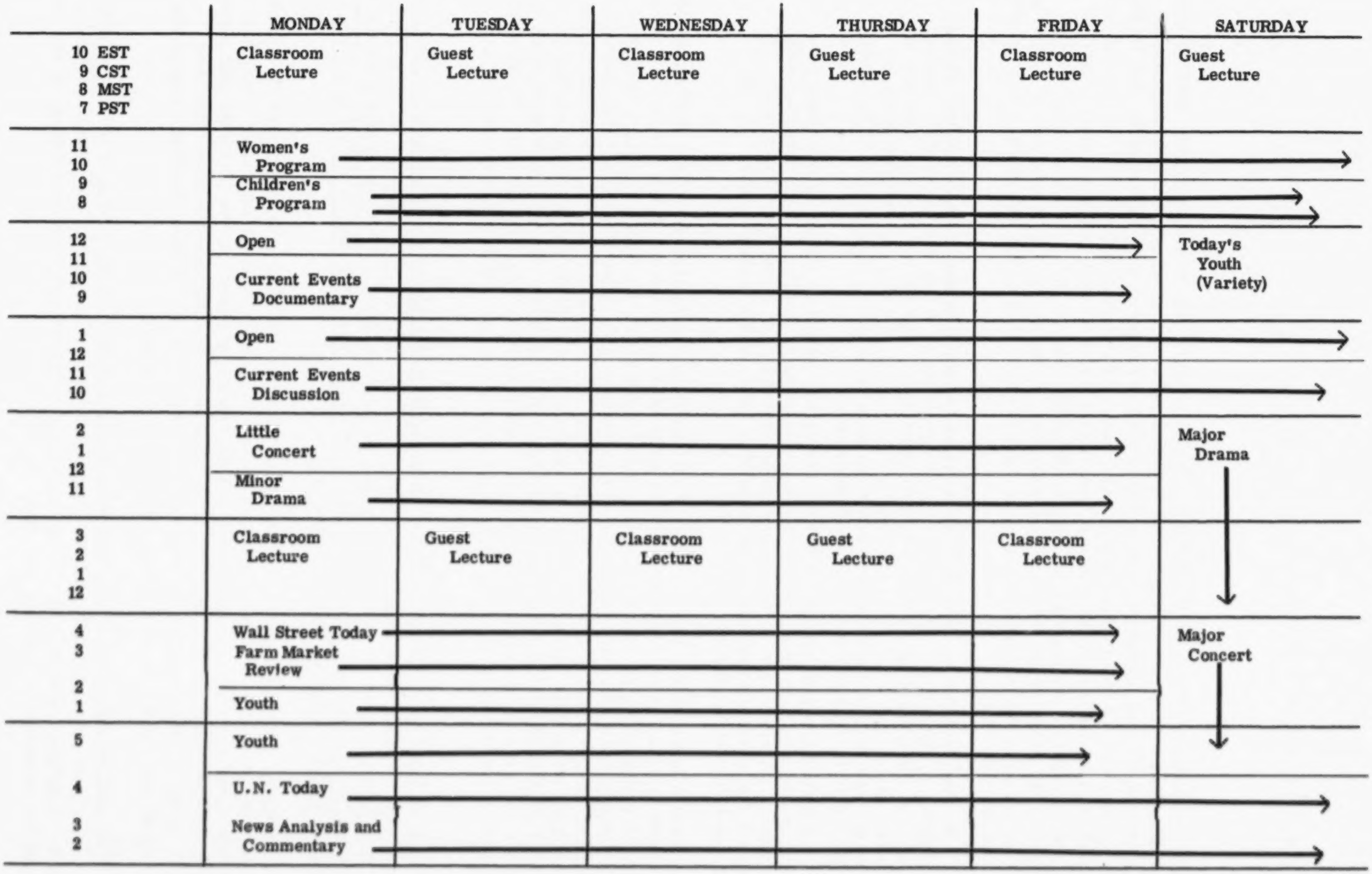
> We are compelled to put most of our energies into our television planning because it is so expensive, so elaborate, so demanding, so all-consuming of money and talent and program materials. It costs roughly ten times what radio does. But let me just turn that around and remind you that radio costs only one-tenth as much, that you can have ten times the time on radio for the same price. Radio has been in eclipse in commercial broadcasting since the more dramatic development of television.
>
> But it is on radio that there is time to talk...a chance to tell the whole story...to finish the lecture...to give everyone his say...to explore all sides...to go into the issue in depth...to present and encourage and enjoy good talk...to forget the tyranny of the TV clock for long enough intervals to get something said...to let a person choose his own pace and discuss the thing in his own way.

It would almost seem that the station managers and program directors who indicated in our recent questionnaire the kinds of programs they could give and the kinds they would take, should a live network be established, were students of the Lyons school. With remarkable consistency they offered to provide programs that penetrate rather than survey, and indicated at the same time a willingness to accept a wide latitude in the length of the programs they would take from the net. Furthermore, the great number and variety of programs volunteered give ample assurance that a full schedule of quality offerings can be selected by the network program director. In short, from a programing point of view, a live network is definitely possible. It is a case of "You get the plans because I've got the lumber!"

There is little need to dwell on the advantages of increased sharing of program talent. The tape network subscribers have enjoyed these benefits for the past ten years and their stations have grown in stature and value because of them. Our job at the moment is to determine what additional advantages live networking can offer and to decide whether they will be worth the added cost of operation.

The program information on the following pages is based on the results of the above-mentioned questionnaires. They were sent to the 137 NAEB Actives operating radio stations in the forty-eight contiguous states. This report is based on the 73 (53%) that were completed and returned by the deadline. Six indicated, for various reasons, that they would be unable to participate in a live net; the remaining 67 showed interest ranging all the way from skepticism to dedication...and that's a mighty long way!

These preliminary papers are merely for the purpose of presenting a basis for discussion. They must necessarily contain many arbitrary conclusions; they most certainly leave many questions unanswered. Their only aim is to stimulate your thinking at the beginning of the seminar so that we can start in high gear.



	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
10 EST 9 CST 8 MST 7 PST	Classroom Lecture	Guest Lecture	Classroom Lecture	Guest Lecture	Classroom Lecture	Guest Lecture
11 10	Women's Program	→	→	→	→	→
9 8	Children's Program	→	→	→	→	→
12	Open	→	→	→	→	Today's Youth (Variety)
11 10 9	Current Events Documentary	→	→	→	→	
1	Open	→	→	→	→	→
12 11 10	Current Events Discussion	→	→	→	→	→
2 1	Little Concert	→	→	→	→	Major Drama
12 11	Minor Drama	→	→	→	→	↓
3 2 1 12	Classroom Lecture	Guest Lecture	Classroom Lecture	Guest Lecture	Classroom Lecture	↓
4	Wall Street Today	→	→	→	→	Major Concert
3	Farm Market Review	→	→	→	→	↓
2 1	Youth	→	→	→	→	↓
5	Youth	→	→	→	→	↓
4	U.N. Today	→	→	→	→	→
3 2	News Analysis and Commentary	→	→	→	→	→

Figure 1

The sample program schedule on this chart [Figure 1] is based on the following assumptions:

1. The maximum initial operation will be eight hours a day, six days a week, twelve months a year. The broadcast day will run from 10 A.M. to 6 P.M. EST
9 A.M. to 5 P.M. CST
8 A.M. to 4 P.M. MST
7 A.M. to 3 P.M. PST

2. Programs will be selected primarily for a "general audience." While some may be acceptable for in-school use, the obvious scheduling problems preclude this as a primary consideration.

3. Every effort will be made to exploit the time advantage offered by live programing.

4. Every effort will be made to exploit the special and unique talents each member station is able to present. (Geographic location, special production facilities, outstanding talent resources, etc.)

In addition to your program suggestions, many of you volunteered further comments about the proposal. A few typical ones are included here to help pinpoint the basic considerations.

> I think the idea is very exciting—a tremendous opportunity for NAEB and a real service for its listeners. As fine as the tape network is, a live network ought to go much closer toward giving educational radio its proper place in U. S. broadcasting.

* * *

> Choose a pool of the best minds on our college campuses. Alert them to be ready. When a news event occurs pick the best man (or men) in the pool to comment on that particular event. Put him on live with a 15-minute analysis on the day the event occurs.

* * *

> In my view the best use of a live network would involve news in some form. All other uses are questionable (especially music, if for no other reason than the poor quality of network lines, assuming this is how it would be handled.)

* * *

> It strikes me that most of this, except the news, is material that really might be distributed just as well under the present tape system, which is also cheaper. A really good news commentator, though, such as ERN's Louis Lyons, giving two broadcasts each evening, would be more suitable for live network programing.

* * *

> We have been operating a live educational network for the past several months and the major usage has been in the reporting of live news and special events. We are, obviously, tremendously interested in live networking but our view is that the emphasis should be on those programs which require instantaneous exposure and not programing which can be originated by an individual station or a library type of programing, which could best be handled via tape.

* * *

> Herewith your program-source questionnaire, filled out with high hopes, some misgivings, and considerable enthusiasm.

* * *

We have several sources of good programing that we could furnish the network and our administration is very sympathetic toward our becoming members of a national network.

* * *

I don't want any live network material that could be handled better or as well by tape.

Now I would like to summarize the results of the survey conducted by the NAEB radio network committee in May. Of necessity many of the answers on the questionnaires were vague and conditional, but the over-all results give a reasonably clear indication of the kinds of programs that are now available, or that can be made available, and the kinds most desired by prospective network members.

DRAMA

Nineteen stations indicated ability to provide dramatic programs. A wide variety of lengths and subjects...from daily 15-minute "Student Workshop" productions for children to weekly half-hour dramatizations of great novels to occasional full-length productions of adult plays.

There is a real need for professional radio drama. Twenty-seven respondents asked for weekly 30-minute or 60-minute adult plays; seven specified weekly full-length plays lasting up to two hours or more (if necessary) and nine others need daily or weekly 15-minute dramas. (The in-school people have a "fidget problem" which must be met by short-span programs.)

LIVE MUSIC

There is lots of it available and much of it is certainly of high quality. There's everything from 15-minute weekly recitals by advanced students to annual local music festivals. Several stations in metropolitan centers can produce daily recitals by professional musicians (although there might be a union problem here). And some of the college and university members with strong music departments can provide weekly orchestra and choral concerts, and there are lots of salon and ensemble possibilities.

Opinion varied widely regarding programing music on a live net. Some desire daily or weekly concerts of 30 to 60 minutes in length; two suggested two or more full-length concerts (1 1/2 to 2 hours) per week; twenty-one indicated no interest in network music. Some recommended "specials" only...seasonal productions, music festivals, etc. There is a strong feeling that a good tape recording is more desirable than wire-line transmission.

CURRENT EVENTS DISCUSSION

This is a fertile field! At least thirteen stations are now presenting such, or are in position to start one on a weekly half-hour basis; two are producing hour-long weekly discussions. In addition there are a few youth discussions of varying length, plus the highly regarded interviews Louis Lyons conducts with a guest in the news three times (15 minutes) each week. The latter are carried by the northeast network and are available on a nationwide basis.

Demand for good, lively, responsible public affairs discussion is high. Most needed are 30-minute weekly programs, while six stations would like at least three per week and one news-minded manager requests ten per week! Another suggested, "I have in mind a live discussion between participants at different stations using the net to make possible meetings of minds at far-flung schools." An "open mike" round-robin type of discussion should be investigated. It could have exciting possibilities.

NEWS ANALYSIS AND COMMENTARY

Again, another area of great interest. Seventeen stations are now in the business. Most offer general news commentaries, while others concentrate on politics, the European scene, foreign press, regional affairs, U.S. editorials, and news magazines. Clearly there is some top-notch talent available. Most programs are 15 minutes long, from one to five times weekly.

Nearly everyone wants them, the majority suggesting 15 minutes a day. One member feels that news programs are the only kind that could be justified on a national live net: "It strikes me that most of this [program types on the questionnaire], except the news, is material that might be distributed just as well under the present tape system, which is also cheaper."

SPORTS

At least eighteen college stations are in position to feed football and basketball play-by-play to the net. Also, a number of quarter-hour sports roundups are available.

It would appear that NAEB stations are more interested in mental gymnastics than physical ones. Fifty-seven of the respondents showed no apparent interest in a sports network. Four, however, suggested a "game of the week" in season; four also a daily or weekly sports roundup on the round robin.

DOCUMENTARY

There are a few in-depth reporting examples using the documentary technique available immediately; others could be produced on assignment by several of the larger, well-staffed stations. It appears that a weekly half-hour documentary report on a current news topic is well within the realm of possibility.

There is strong support for this type of program. A weekly half-hour appears to be most popular, with sixteen "votes." Six others suggested a quarter-hour per week; six more would settle for 30 to 60 minutes a week; while another six felt that documentaries of 30, 60, or 90 minutes' duration would be welcome whenever available. Clearly this is another area that should be investigated.

WOMEN'S PROGRAMS

Most of the land-grant colleges are producing daily or weekly programs for homemakers which could be adapted for national use if needed. In addition, KUOM suggested the possibility of developing a new series through the facilities of the Minnesota Plan for Continuing Education for Women.

At the same time, there was little interest in such among potential network members. Only thirteen indicated they would program them; a weekly 15-minute or 30-minute program would be satisfactory. This may be something best produced on a local basis. Then again, perhaps a well-conceived series intended for national reception could be developed.

CHILDREN'S

A wide variety is available for the pre-schoolers, elementary-age, and sub-teens. There is ample material for at least a daily quarter-hour, assuming satisfactory production quality.

Two dozen members would carry network programs for children. As a compromise to meet the varying needs of the stations, a daily half-hour program which could be scheduled locally as a single program or as two quarter-hour shows is suggested.

FARM

Only a few are being produced now...by the land-grant colleges. As presently conceived, they appear to be regional in character. Perhaps one weekly composite half-hour program could be arranged with key stations in the various agricultural areas of the country. A daily market review, covering farm commodities (grains, livestock, and produce) and the Wall Street exchanges, and designed for service to the "small time" investor, would be useful.

Under present conditions there is little demand for farm and market programs from the net.

CLASSROOM LECTURE

Again, there is a great abundance of presumably excellent material. By means of an extensive screening process, it would be possible to establish a catalog of subject-matter specialists known to be accomplished lecturers. Most schools could produce at least one, the larger schools several—all with national reputations. It is questionable whether courses for credit could be handled on a national basis, however.

There would apparently be wide acceptance of one to two lecture courses a day. In general the stations operated by scientific schools need programs in the humanities, and liberal arts schools request lectures in the physical sciences. In addition there is a general need for programs in political science and social studies.

MISCELLANEOUS TALK PROGRAMS

Some interesting things are being done currently that merit national distribution. Typical areas include semantics, physical and mental health, poetry reading (in addition to no end of "chapter a day" readings), career guidance, and speech making. (Does anyone work with the local Toastmasters Club?)

There are many unfilled needs that bear consideration. It appears there are enough special guest lectures on our various campuses to provide one outstanding speaker a week while his words were still fresh and timely. Daily coverage of the U.N. and Congress is possible and would fill a real need. Inter-school discussions and conference calls to sites of news stories are also suggested. At least one program a week for teen-agers (music, news, career guidance, manners and grooming, etc.) and a weekly program for the "golden agers" are needed.

These suggestions give a general picture of the program needs and resources of NAEB stations.

DISCUSSION

VOGL: Using the information received from the questionnaire, a sample network schedule [Figure 1] has been offered for your consideration. I want you all to feel free to suggest any changes that would improve it.

I have a few comments to add to my prepared paper, to get the discussion started.

Are the commercial networks doing an adequate job on news analysis and commentary? Are they doing more than we could ever do? Or are there things which we could do which they cannot? Do any commercial networks reflect the views of foreign commentators?

Members have shown considerable interest in documentaries. NAEB has already done several. Most of these are timeless, and we use them again and again. But there are many problems which are timely and which can be produced in documentary form very quickly, used once, and forgotten.

Women's programs are now being handled largely by land-grant schools and college stations, but we could certainly present book reviews, play reviews, and musical discussions directed primarily toward an audience of women.

I have suggested a children's program for a half-hour every day, split into 15-minute segments; also one hour every day for youth programs. This has up to now not been explored very much.

There are some items on the chart [Figure 1] which are placed at specific times for specific reasons. For instance, at 4 p.m. Eastern Standard Time, I have placed a report from Wall Street. Since the Market closes at 3 p.m., I am sure we could get some report by 4 p.m.

GUNN: Such a thing already exists. WNYC does such a program daily from 3:30 to 4:00.

VOGL: Also I have listed a farm market review at 3:15 CST. Late in the afternoon there might be a U.N. report and news commentaries. We should also be able to present formal, educational classroom lectures. What are some of you doing now in this field?

R. HILL: At Syracuse, Russian by radio.

PRESS: There is almost nothing that can't be done, once it is agreed upon that this is desirable.

FREDETTE: We have tremendous material available, but we are trying to educate the educator to eliminate the crutch of visuals.

VOGL: Let's move on to the guest lecturer. What have some of you done with lecturers or seminars?

BROWNE: We had Harry Truman last year.

FRYMIRE: Annual Asian Institute and Canadian-American Seminar, which bring international authorities to our campus.

NELSON: There is a problem with someone like Truman because he travels to many colleges. When we put him on the air it cuts him out of his lecture in all the others.

VOGL: We are not speaking of the traveling lecturer because there you do run into problems. I am speaking primarily of the academic seminar being conducted on a campus or in a community. You may run into performance-rights problems in broadcasting musical programs. Burton Paulu has secured the rights for twenty Minneapolis Symphony concerts. We would hope that we would be able to secure rights to send that over our national educational network. The same is true of many dramatic presentations.

PAULU: Is it your idea that these musical and dramatic programs and guest lecturers should be presented on tape or live?

VOGL: It is not my thinking that it be done either way. We are here to decide that very thing.

PAULU: What I mean is, should these programs be presented over the network live or should they be recorded and then sent over the network?

PRESS: In either case what we really need is some new writing. I think we could get this if we had a national network. Were the daytime hours selected arbitrarily?

VOGL: Completely. Also, we have arbitrarily offered a continuous schedule. Perhaps we would do better to go on for a couple of hours in the morning and a couple of hours in the evening.

WRIGHT: Why have you chosen daylight hours? We do not consider this our major audience. Is it because there are more daylight hours on most of these stations?

VOGL: Yes. Also there is more competition from commercial radio and TV in the evening.

EBLEN: A timely program coming from New York at 10 a.m. EST certainly would not be presented on the West Coast immediately in a live form, since it would only be 7 a.m. out there. You would have to record this program and present it at a more suitable time.

VOGL: Yes. This would be infinitely more valuable.

QUAYLE: Since most of our NAEB member stations are FM stations, we are not too concerned about daylight-only stations. These stations don't have to concentrate their programing in the daylight hours. Therefore, one of the great advantages to those stations which are now able to operate only from 5 p.m. to midnight would be that, maybe with the addition of one engineer to throw in station breaks, they might be able to increase their entire day by eight hours if this were carried on a daylight basis. This could be done at very little additional cost.

Are you thinking in terms of this program structure as a balanced program structure?

VOGL: No. Any station is going to have local programs reflecting only its own broadcast area which it will use to supplement this schedule.

Another consideration is the greater coverage attained by the AM stations even though they are fewer in number.

DREYFUS: From the standpoint of programing, this represents a substantial increase compared to the programing we now distribute via the tape network.

VOGL: Correct.

DREYFUS: Apparently, there is not really much of a change in type. What would the live-network technique do in terms of type? What would it add?

VOGL: Some programs on this chart might be presented as well, and perhaps even better, on tape. I am hoping that you all will be able to add to this schedule many new and original program types.

BROWNE: Is there some reason associated with economy or line costs which caused you to put together a schedule like this rather than having a couple of hours in the morning, a couple in the afternoon, and a couple at night with dead areas between?

VOGL: I don't know off-hand how the line costs would vary in those instances.

H. HILL: There will be three AT&T men here this afternoon and for the rest of the conference, and they will be able to answer that question.

VOGL: In making this schedule we didn't include such cost considerations at all. We considered a wire-line network and also the possibility of a wireless, microwave relay, or airborne system. This would have a great effect on whether or not we include concert music. We can get a much better frequency response from a good tape recording than we can over a wire today. But on wireless relay you can attain comparable quality to that which you get on a tape recording.

BROWNE: I raised this question because we have our largest audience at night and, therefore, we would be far more interested in this sort of thing at night. I believe the greatest value of this is going to be in the timely category. The psychological factor works both ways. When the person speaking knows he is on live, it does something to him psychologically. Also when the person listening knows that this is live and happening now, it also has a psychological effect on him.

VOGL: I would envision that prior to going on the air each day there would be a closed-circuit discussion, with the network headquarters giving any last-minute changes in the schedule. And I would envision that there would be many changes and cancellations because of timely events of great interest. Commercial networks are unable to make these instantaneous changes.

PAULU: What would be the relationship between this live network and the NAEB tape network and/or the BFA?

VOGL: Time will tell. I don't have the answer. I don't think that one necessarily precludes the other.

PAULU: I can see that in the case of a matter that is very timely this live network can supply something that tape cannot. But in the realm of drama and certain kinds of talks and lectures, do we want to record Great Man X off the line in the morning and broadcast him at night, or do we want to take the thing on tape in the first place? We have to think this thing through since it may be a choice of putting the money in one place and not the other.

VOGL: I don't think anyone has assumed that this would necessarily eliminate the tape network.

HARRISON: I think we should remember that it is far more economical to have one man in Urbana knocking out 176 or so tapes than it is to feed it down the line and have 176 eager engineers failing to record the first two minutes.

NELSON: What about youth programs which you have listed on the chart?

VOGL: This is something which I haven't thought through. I was thinking of something other than youth discussion programs. I would welcome ideas on this. No one really seems to be doing anything in this area today.

NELSON: I think we have to be careful not to let the schedule get too heavy. I want to relate this to athletics. I think the commercial networks are carrying plenty of football games, but on our campus Gene Wettsall does a remarkable job with gymnastics. We have the Finnish group there. This serves two purposes: (1) the matter of better international relations and (2) the matter of physical fitness for everyone. A good jazz program might also be useful. We should lighten the schedule in order to attract more listeners.

VOGL: This is a good point. We haven't begun to explore all the possibilities. We should try to expose the kids to more than just the rock and roll they get on the jukebox. The schedules will vary from area to area according to the regional culture.

ELLIS: Should the program schedule be a total service to which the audience should, theoretically, listen throughout the day? Or should it be a service to which they are attracted by individual programs, programs which they listen to and then go elsewhere for entertainment?

VOGL: No one can program your station for you. Every station must do its own programing and "trim its sails to suit the wind." Only you know what your audience needs and wants.

H. HILL: The same thing applies here that applies to the tape network. There are many things that some of you might not want to take because you can do it better on your own campus. The wealthy or strong assist the weak. There are many things here which you would want. There are several educational stations across the country which do not have on their faculties the people you're talking about. For that reason, we now program on the tape network certain things which we know you can do better than we can give you. We would do likewise on a live network to provide the programing backlog for those persons unable to provide it for themselves, at the same time providing those little gems which you cannot get any other way.

VOGL: To answer the question about administrative problems, obviously we would have to have a Superman at headquarters who has all the answers and two or three satellite Supermen who go around the country seeking out programs that a given station might be in a position to produce, but for one reason or another is not producing.

FRYMIRE: This may help to stimulate campus activity. People will ask, "Why did you carry that fellow and not us?"

GUNN: It is better to have a few persons mad than to have them say, "We just don't care."

HARRISON: I notice that you feel that six days man hath labored and done all his work. Do you know just how many stations operate on Sunday?

H. HILL: Almost all of them.

HARRISON: How many stations operate after local sunset?

H. HILL: All but two or three.

VOGL: There is no doubt that a national live network would add tremendous prestige to educational broadcasting.

HARRISON: Someone suggested that this might open up opportunities to institutions which are not now broadcasting—to put in a package which would be turned on in the morning and turned off in the evening, with the network going all day. Someone should be exploring what a package deal of this kind would cost.

radio network planning

by

Carl H. Menzer

22

The feasibility of a live NAEB radio network has been under consideration for a number of years. Although the present tape network contributes much, it is felt that a live network offers many advantages. It is true that television has taken the spotlight during the past few years but recent surveys indicate that radio broadcasting, instead of decreasing in popularity, is not only continuing to serve but is gaining in listeners and number of receivers in use, in a remarkable fashion. Obviously there is a place for each, and those places are becoming more clearly defined each day. The result is a realization that radio can do many things as well as, or better than, television—and certainly a great deal less expensively.

It has been suggested that any network should be programed on a mutual basis and planning is for a modified round-robin type of service so contributions could come from any one of the affiliated stations at any time. The service would be available to all stations continuously, but if any station had local commitments or preferred its own program, it need only withdraw from the network feed.

A few of the advantages of such a network are:

1. One of the major problems of educational stations is programing. A network such as is proposed would not only allow any station to discharge its local responsibilities but would offer the nation's outstanding program service throughout the broadcast day. There is little doubt but that contributions from institutions represented by NAEB membership, presently available and with little added burden, could provide a network service which would easily challenge anything the commercial networks could offer.

2. It would add stature and give prestige to member stations and to NAEB, as well as strengthen the station's public relations. If service to members is an important function of NAEB, such a network would help the organization to discharge this obligation in an outstanding fashion.

3. The line facilities would provide a closed communications channel between NAEB Headquarters and member stations at other than broadcast hours. It would also provide a means to transmit present tape network programs at other than broadcast hours when they could be recorded locally, thus reducing costs of tapes, dubbing, handling, mailing, etc.

4. The element of competition would tend to upgrade production and it seems likely that much outstanding material from our various institutions would be more easily available if the contributor knew his message would reach a nationwide audience. In addition, such a live network would bring outstanding events to listeners as they happen; it would provide a wide variety of programing not now available; and it would broaden program horizons.

5. By using network programs, a station's normal program production budget might be materially reduced, allowing increased efforts in other areas as well as in the production of special network presentations.

6. The small school station with a limited budget, which now programs only a few hours of in-school broadcast material, could become a community station and supply listeners in its area, at other hours, with the highest class educational and cultural service.

Many other exciting advantages will become apparent with little thought.

Figure 2 shows the locations of NAEB radio stations. It is obvious that the uneven distribution of stations immediately presents a problem. There is also the problem of a three-hour time differential between extremes. This latter, however, would not be as serious as might be expected, as it has been successfully solved by the commercial networks. There are, of course, decided advantages to a network with full national coverage. Actually the important item is that of long-haul telephone circuits over western areas not now served by educational stations. There might be advantages in the organization of several regional networks which could be joined as the operations settled. Certainly it is much easier to work out detailed costs, programing, and routines of operation if only a regional network is involved.

With the above in mind, a group of midwestern stations was arbitrarily selected and a preliminary survey was made. It must be understood that this selection of stations was purely arbitrary and neither the number of stations nor the configuration of the regional network should be considered as the best arrangement. It was necessary to use some definite starting point in order to secure data on costs and programing facilities, and this study should be considered only as a point of departure.

Based on network operation eight hours daily, seven days per week—with fifteen minutes each day used for closed-circuit network business, program corrections, traffic orders, etc.—54 1/4 hours of programing, weekly, would be required. A survey indicated that of the fifty-two stations involved, thirteen stations, along with other available sources, could supply approximately 170 hours of programing of network calibre. Obviously some very critical selection could be made.

Using the above-noted thirteen stations as a round-robin basic network (See Figure 3), the remaining thirty-nine could be fed on a one-way basis. This does not mean that these thirty-nine stations could not contribute programs to the network. Their programs could be carried on the network by line reversal whenever they had suitable material.

Figure 4 is a map of station locations and shows the configuration of this regional network along with the area served.

Figure 5 shows approximate monthly wireline costs. These are based on Schedule A service, the best the telephone company has to offer, and similar to that used by commercial networks.

Figure 6 indicates a possible line routing of round-robin and one-way feeds with monthly wireline costs for each leg.

When considering the financing of such a regional network there are various alternatives. The ultimate goal should be the complete network where wireline costs are $17,585 per month. However, to start, minimum requirements for the basic round-robin network are $8,569 per month. With this amount, the network could go into operation and one-way feeds could be added as desired.

Another type of mutually programed regional network is that proposed for the northeastern states. (Refer to Figure 7.) In this plan it is proposed to use FM relay stations instead of wireline connections. The use of a multiplex system is also suggested. A limited portion of this network is now in operation using direct off-the-air pickup for relaying purposes.

If it is found desirable to organize regional networks which could be joined to form a national network, Figure 8 suggests a point of departure for discussion. To divide the nation into regional network areas will require considerable study. Many things are involved

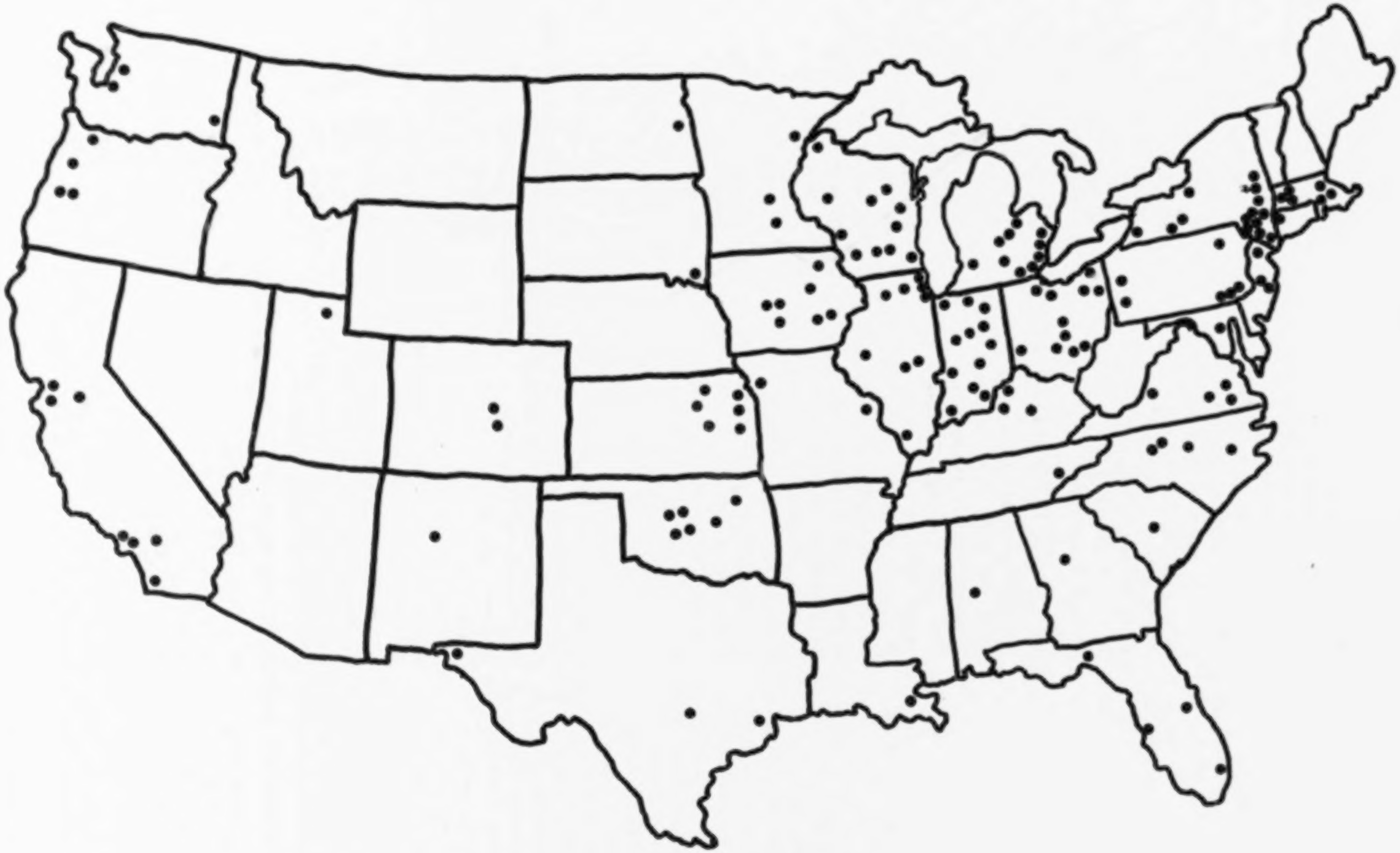


Figure 2 NAEB Radio Stations

ROUND-ROBIN BASIC NETWORK

WILL	Urbana, Ill.	University of Illinois	5 KW AM - 50 KW FM
WSUI	Iowa City, Iowa	State University of Iowa	5 KW AM - 3 KW FM
WOI	Ames, Iowa	Iowa State University	5 KW AM - 3 KW FM
KUOM	Minneapolis, Minn.	University of Minnesota	5 KW AM
WHA	Madison, Wis.	University of Wisconsin	5 KW AM - 3 KW FM
WBEZ	Chicago, Ill.	Chicago Board of Education	3 KW FM
WKAR	East Lansing, Mich.	Michigan State University	5 KW AM - 3 KW FM
WDTR	Detroit, Mich.	Detroit Board of Education	2 KW FM
WDET	Detroit, Mich.	Wayne State University	7.6 KW FM
WUOM	Ann Arbor, Mich.	University of Michigan	10 KW FM
WOSU	Columbus, Ohio	Ohio State University	5 KW AM - 3 KW FM
WFIU	Bloomington, Ind.	Indiana University	10 KW FM
WBAA	LaFayette, Ind.	Purdue University	5 KW AM

ABOVE STATIONS TO FEED FOLLOWING STATIONS (ONE-WAY)

WSRV	Carbondale, Ill.	Southern Illinois University	3 KW FM
KSLH	St. Louis, Mo.	St. Louis Board of Education	3 KW FM
WWKS	Macomb, Ill.	Western Illinois University	3 KW FM
KDPS	Des Moines, Ia.	Des Moines Public Schools	1 KW FM
KWLC	Decorah, Ia.	Luther College	250 Watt AM
WCAL	Northfield, Minn.	St. Olaf College	10 KW AM
WNIC	DeKalb, Ill.	Northern Illinois University	10 Watt FM
WEPS	Elgin, Ill.	Elgin Public Schools	10 Watt FM
WNUR	Evanston, Ill.	Northwestern University	10 Watt FM
WGVE	Gary, Ind.	School City of Gary	10 Watt FM
WETL	South Bend, Ind.	School City of South Bend	250 Watt FM
WMCR	Kalamazoo, Mich.	Western Michigan University	10 KW FM
WFBE	Flint, Mich.	Flint Public Schools	1 KW FM
WOAK	Royal Oak, Mich.	School District of Royal Oak	10 Watt FM
WHPR	Highland Park, Mich.	School District of Highland Park	10 Watt FM
WTDS	Toledo, Ohio	Toledo Public Schools	250 Watt FM
WBOE	Cleveland, Ohio	Cleveland Board of Education	9 KW FM
WAPS	Akron, Ohio	Akron Public Schools	1 KW FM
WKSU	Kent, Ohio	Kent State University	10 Watt FM
WOUI	Athens, Ohio	The Ohio University	250 Watt AM - 10 Watt FM
WCBE	Columbus, Ohio	Board of Education City School District	9 KW FM
WSLN	Delaware, Ohio	Ohio Wesleyan University	10 Watt FM
WYSO	Yellow Springs, Ohio	Antioch College	10 Watt FM
WMUB	Oxford, Ohio	Miami University	250 Watt FM
WVSH	Huntington, Ind.	School City of Huntington	10 Watt FM
WSKS	Wabash, Ind.	School City of Wabash	10 Watt FM
WWHI	Muncie, Ind.	Wilson Junior High School	10 Watt FM
WIAN	Indianapolis, Ind.	Indianapolis Public Schools	250 Watt FM
WGRE	Greencastle, Ind.	De Pauw University	10 Watt FM
WBGU	Bowling Green, Ohio	Bowling Green State University	10 Watt FM
WPSR	Evansville, Ind.	Evansville School Corporation	3 KW FM

FOLLOWING WISCONSIN STATIONS TO BE FED FROM STATE NETWORK

WLBL	Auburndale, Wis.	Wis. State Radio Council	5 KW FM
WHSA	Brule, Wis.	Same	10 KW FM
WHKW	Chilton, Wis.	Same	10 KW FM
WHWC	Colfax, Wis.	Same	10 KW FM
WHAD	Delafield, Wis.	Same	10 KW FM
WHHI	Highland, Wis.	Same	10 KW FM
WHRM	Rib Mountain, Wis.	Same	10 KW FM
WHLA	West Salem, Wis.	Same	7 1/2 KW FM

Figure 3

Radio Network

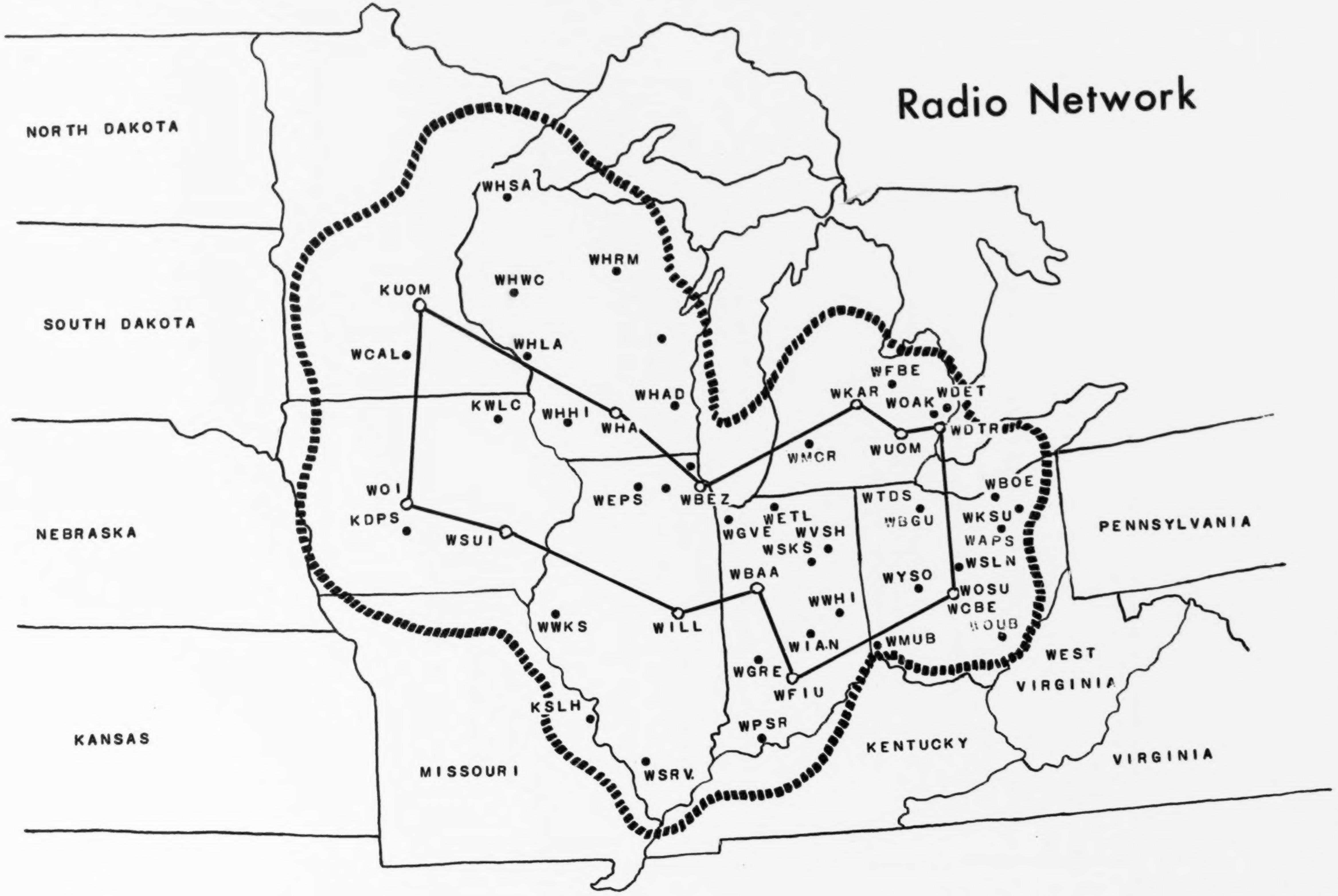

NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
MISSOURI
PENNSYLVANIA
WEST VIRGINIA
VIRGINIA
KENTUCKY
WHSA
WHRM
WHWC
KUOM
WHLA
WCAL
WHAD
KWLC
WHHI
WHA
WOI
KDPS
WSUI
WEPS
WBEZ
WMCR
WKAR
WFBE
WOAK
WDET
WDTR
WUOM
WTDS
WBGU
WBOE
WKSU
WAPS
WSLN
WOSU
WCBE
WOUB
WYSO
WETL
WGVE
WVSH
WSKS
WBAA
WWHI
WIA.N
WMUB
WWKS
WILL
WGRE
WFIU
WPSR
KSLH
WSRV.

Figure 4

APPROXIMATE MONTHLY WIRELINE CHARGES

Wireline charges based on Schedule "A" Service, 8 hours daily.

Interexchange Channels - $4.50 per airline mile per month
Local Channels estimated - $5.00
Station Connections - $55.00

Basic Round Robin Network		
Interexchange Channels	$7,129.00	
Local Channels - Receive (12)	60.00	
- Transmit (12)	60.00	
Station Connections - Receive (12)	660.00	
- Transmit (12)	660.00	
Total Basic Round Robin Network	$ 8,569.00	$ 8,569.00
Receive Only Stations		
Interexchange Channels	$7,156.00	
Local Channels - Receive Only (31)	155.00	
Station Connections - Receive Only (31)	1,705.00	
Total Receive Only Stations	$ 9,016.00	$ 9,016.00
Total Complete Network		$17,585.00

Figure 5

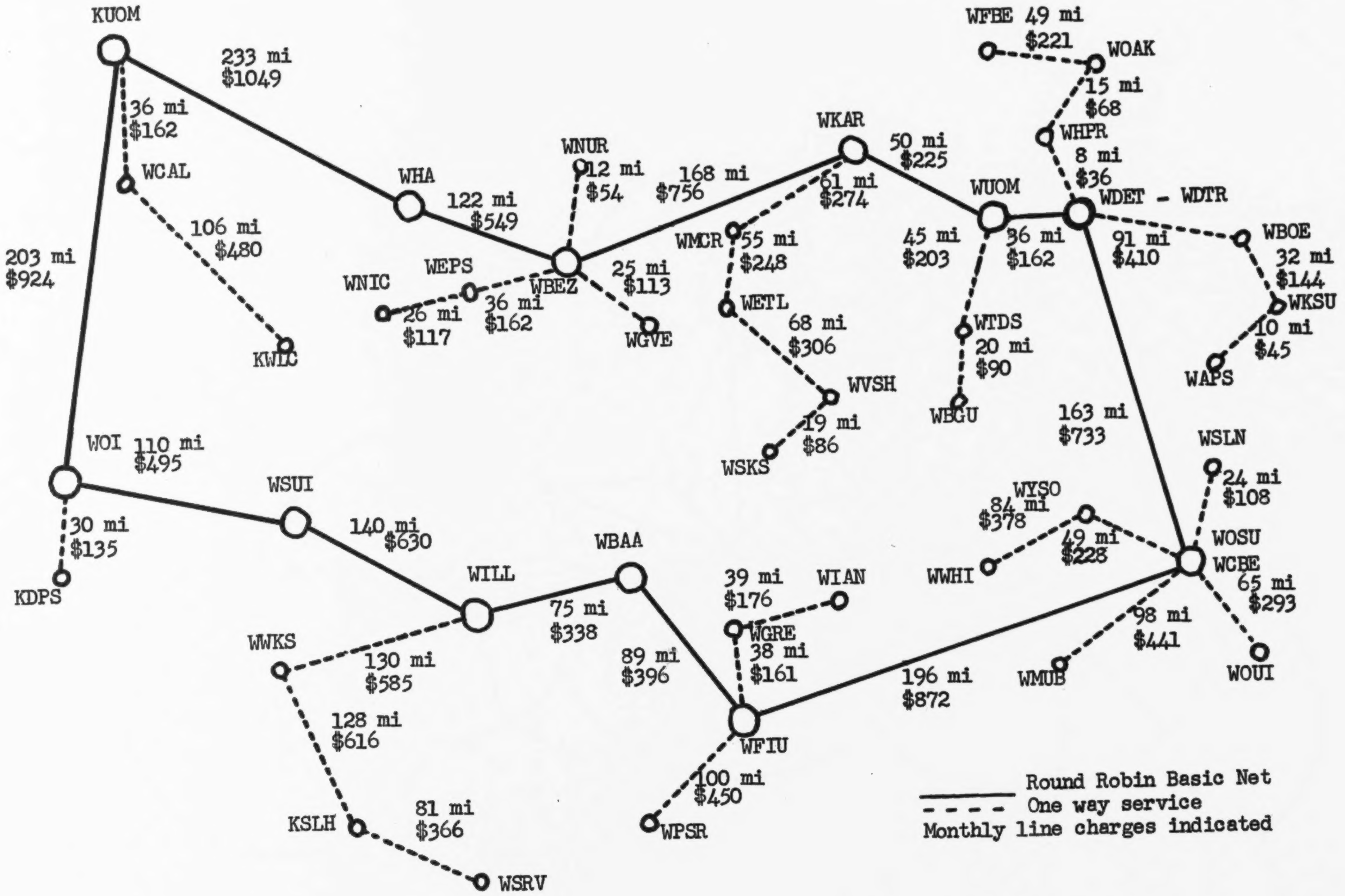

KUOM
233 mi
$1049
36 mi
$162
WCAL
106 mi
$480
KWIC
203 mi
$924
WHA
122 mi
$549
WNUR
12 mi
$54
168 mi
$756
WKAR
50 mi
$225
61 mi
$274
WUOM
WDET - WDTR
WFBE 49 mi
$221
WOAK
15 mi
$68
WHPR
8 mi
$36
WBOE
32 mi
$144
WKSU
10 mi
$45
WAPS
91 mi
$410
36 mi
$162
45 mi
$203
WTDS
20 mi
$90
WBGU
WMCR
55 mi
$248
WETL
68 mi
$306
WVSH
19 mi
$86
WSKS
WNIC
WEPS
WBEZ
25 mi
$113
WGVE
26 mi
$117
36 mi
$162
163 mi
$733
WSLN
24 mi
$108
WOSU
WCBE
65 mi
$293
WOUI
WYSO
84 mi
$378
49 mi
$228
WWHI
98 mi
$441
WMUB
WOI
110 mi
$495
30 mi
$135
KDPS
WSUI
140 mi
$630
WILL
75 mi
$338
WBAA
89 mi
$396
WFIU
39 mi
$176
WIAN
WGRE
38 mi
$161
196 mi
$872
100 mi
$450
WPSR
WWKS
130 mi
$585
128 mi
$616
KSLH
81 mi
$366
WSRV
Round Robin Basic Net
One way service
Monthly line charges indicated

Figure 6

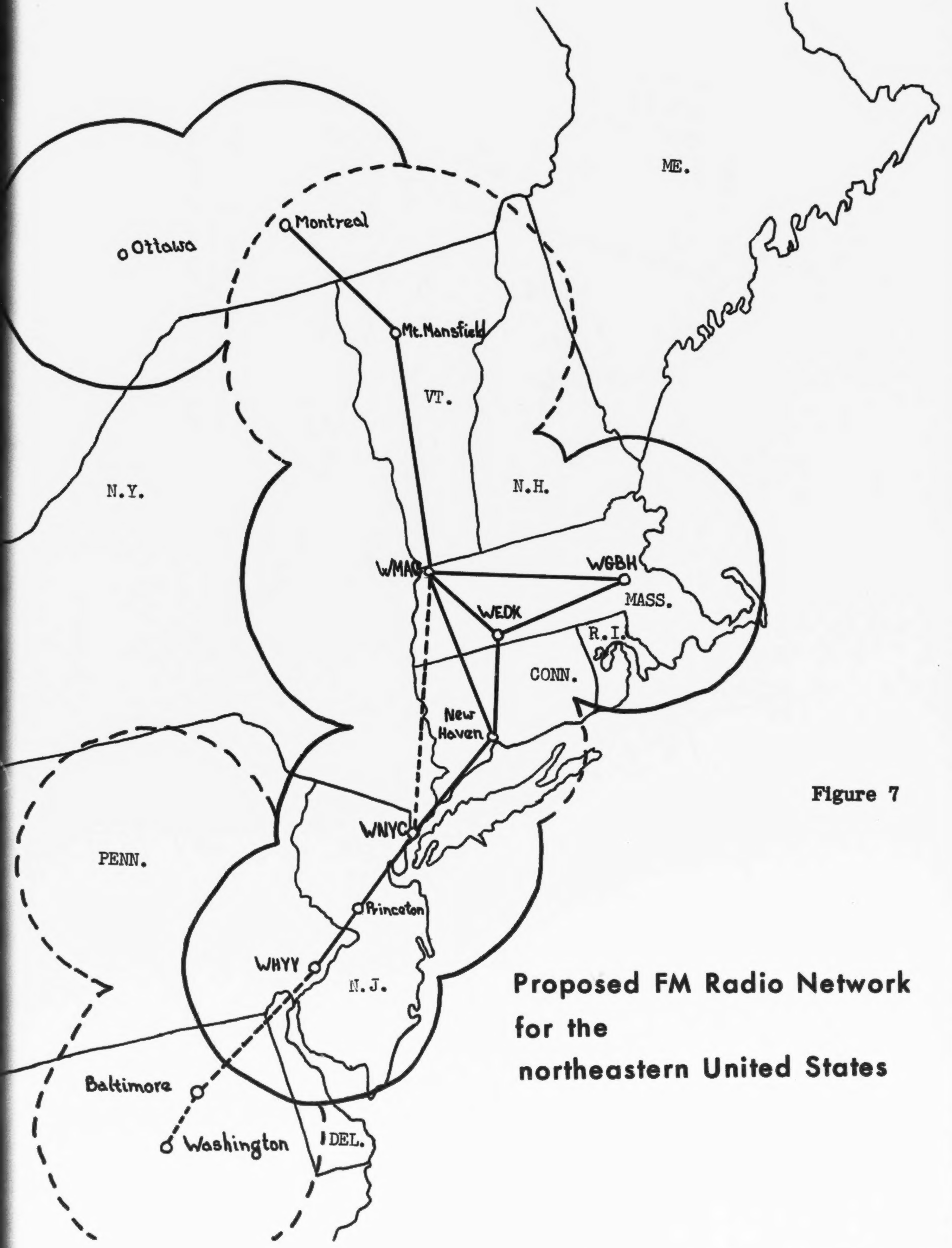

ME.
Montreal
Ottawa
Mt.Mansfield
VT.
N.Y.
N.H.
WMAG
WGBH
MASS.
WEDK
R.I.
CONN.
New Haven
WNYC
PENN.
Princeton
WHYY
N.J.
Baltimore
Washington
DEL.

Figure 7

Proposed FM Radio Network
for the
northeastern United States

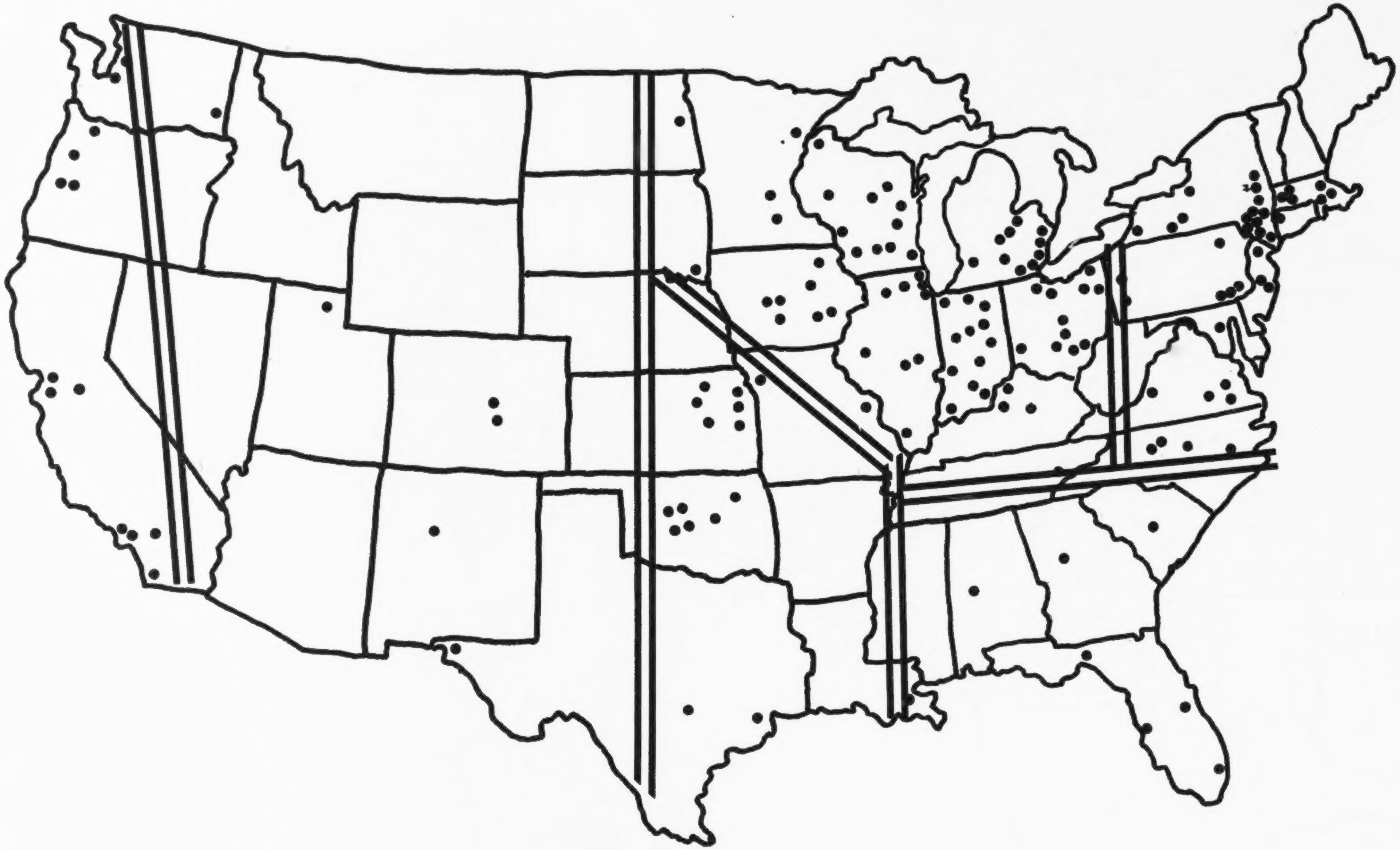


Figure 8 NAEB Radio Stations

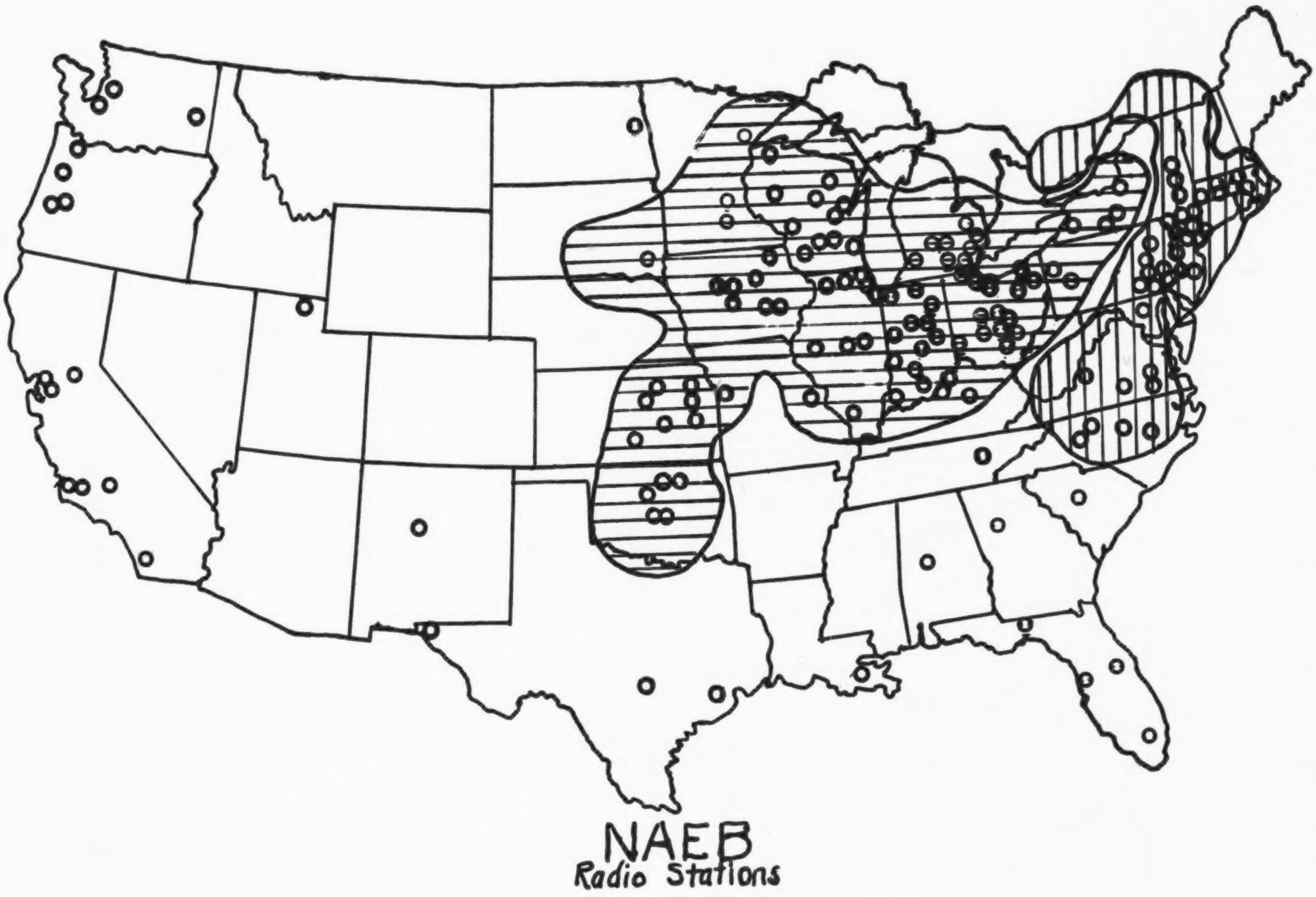

NAEB
Radio Stations

Figure 9

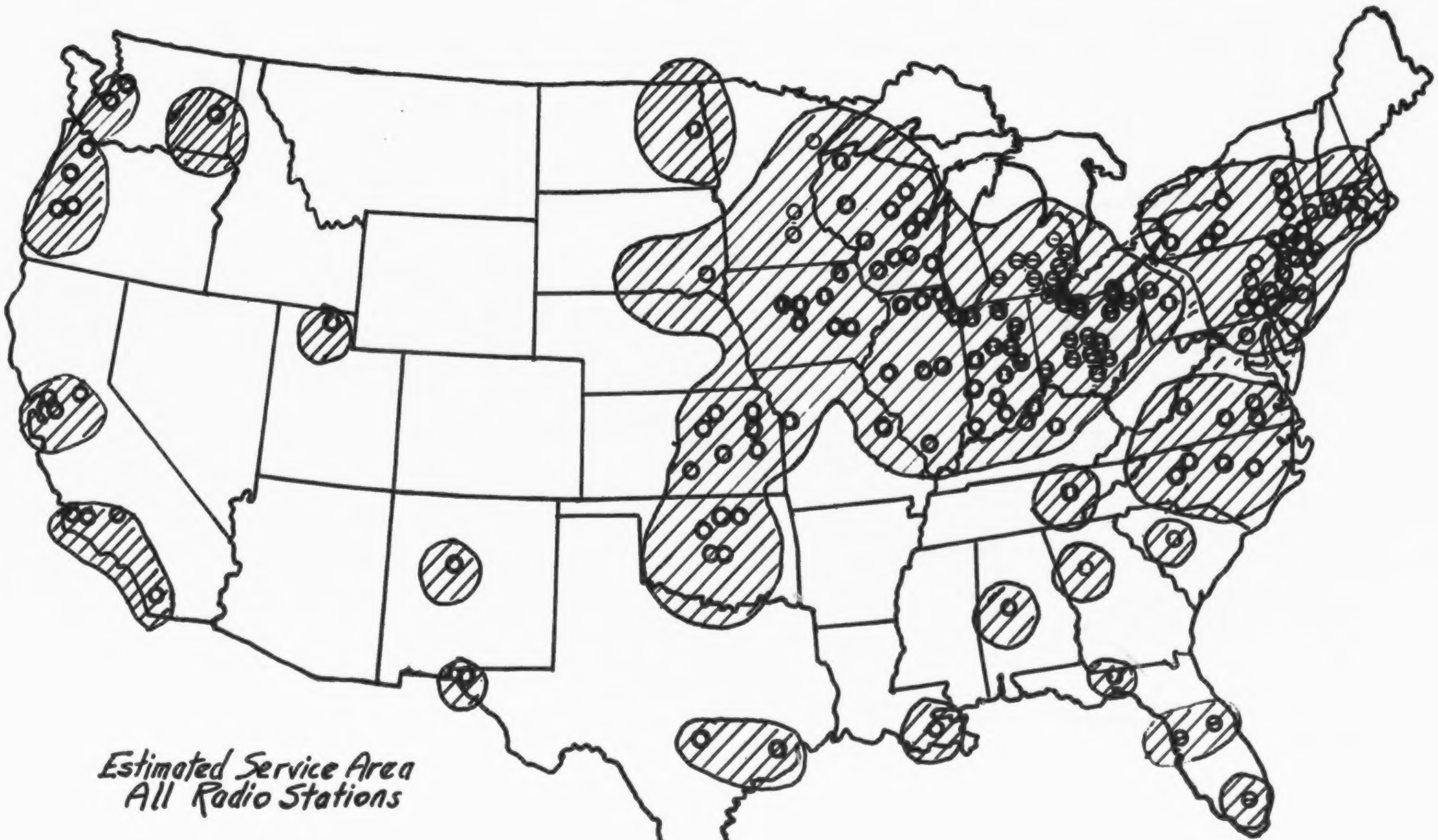

Estimated Service Area
All Radio Stations
NAEB
Radio Stations

Figure 10

such as present network plans, economical methods of relaying programs, individual station facilities and budget, distance between stations, etc.

Figure 9 shows the service areas of the suggested eastern and midwestern regional networks. Figure 10 shows the estimated service area of all NAEB stations.

Turning attention to network operations, the following outline is suggested as material for discussion:

1. Periodic meetings of station and/or program directors, or a programing committee, to go over each station's programs as well as programs from other sources, and outline general schedule in advance. Also to discuss other network business. It may be found that after the operation gets under way these meetings may become less frequent. It may be possible to conduct a major portion of the business over the closed-circuit channel.

2. Employ a network manager who works out detailed program schedule and sends copy to each member well in advance of broadcast.

3. Each day, before network broadcast, the network manager will use the communication facility to advise all stations of any last-minute changes or any network business.

4. In case of emergency, headquarters will transmit a standy-by program.

5. Periodically headquarters will make frequency, distortion, and gain tests on the entire network. Individual stations may check their own loops and equalizing networks, as well as their entire transmitter, from such tests.

6. Operations will be synchronized by Western Union time, with programs to start "straight up" and end thirty seconds before "straight up."

7. Ending cue (suggested): "This is the NAEB Radio Network."

8. Other uses of closed-circuit communications facility to be scheduled by network manager.

9. Investigation of all outside program sources and agreement on their use. Scheduling by network manager.

It seems obvious that any network operation will require the services of a network manager and/or headquarters staff. Such being the case, the following list of functions is suggested for discussion:

1. Act as secretary for station directors or committee meetings.

2. Follow general program selection by station directors or committee and make out detailed program schedule.

3. Notify all stations of program schedule and originating points.

4. Make any changes in daily schedule, using communications facility.

5. Suggest and arrange special features.

6. Keep emergency taped and/or disc programs on hand.

7. Conduct periodic line tests.

8. Investigate other program sources, either live or recorded.
9. Investigate continuing support.
10. Act as clearing house and headquarters for handling network business.
11. Keep records of program acceptances.
12. Schedule other uses for closed-circuit communications facility.
13. Keep network records.
14. Obtain clearances.
15. Handle network accounts.

It would obviously be advantageous to locate the network headquarters at NAEB headquarters. It might be possible, however, to consider a location at a member station's studios where much necessary equipment is already available. Costs of office space and equipment may thereby be reduced. The following items and costs must be considered:

1. Office.
2. Secretarial help.
3. Office equipment.
4. Office supplies and telephone expenses.
5. Equipment for transmitting and receiving, including tape recorders and turntables as well as equipment for tests.
6. Travel expense.
7. Salaries (network manager and secretarial).

When considering the organization of a network the following questions are presented for discussion:

I. Type of organization
  a. Integral part of NAEB operations?
  b. Separate branch?
  c. Nonprofit corporation?
  d. Other associations?
  e. Officers?

II. Financing
  a. Individual contributions?
    1. Equal?
    2. Pro-rated?
    3. Other?
  b. Foundation support?
    1. Through NAEB or independently?
    2. Full support?
    3. Full support to start and then made self-supporting?
    4. Other?

c. Method of handling funds, billings, etc.
d. Total costs
  1. Telephone line rental
  2. Salaries
  3. Office and office supplies
  4. Equipment
  5. Travel
  6. Telephone calls
  7. Other

III. Network headquarters
  a. Location
    1. Convenience
    2. Facilities available
    3. Other
  b. Headquarters staff
    1. Network manager—selection, salary
    2. Secretarial—number, selection, salaries
  c. Duties (See above)

IV. Programing policy

V. Operations policy (See above)

VI. Steps necessary to start network
  a. Detailed survey
  b. Agreement of all members (Items outlined above)
  c. Arrange financing
  d. Employ network manager and staff and arrange for headquarters
  e. Order telephone lines
  f. Arrange program schedule
  g. Test run
  h. Starting date
  i. Other

The above, it is hoped, presents a picture of the proposed network and some of the problems involved in its organization and operation.

DISCUSSION

MENZER: I'd like to call attention to the fact that the paper on network planning was prepared with the idea of presenting material for discussion. It probably presents an optimistic report. I'm not naive enough to believe that such a network is the answer to all educational radio problems, but I do believe it offers many exciting possibilities. We're here to discuss the good and the bad and to see—if there is a balance in the positive direction—what can be done about it.

Actually, there is no question in my mind but what—with the combined resources of all the educational institutions represented in NAEB membership—a day-by-day program can be presented which will provide a service far and above anything ever done by commercial networks. In my opinion it can do many things educational broadcasters have talked and dreamed about ever since educational broadcasting started.

As to operations and economics, the experience gained by commercial operation presents a pretty clear picture: How many commercial stations of stature can afford to make up the major portion of their schedule from locally originated programs? I have heard it expressed by educational station directors that such a mutually programed network will add nothing to what they produce locally. This I question. As a matter of fact, good as I think my own station's programing is, I'll be the first to state that it can be improved—and greatly improved.

Of course, the minute one starts a comparison with commercial network operation, the problem of financing immediately arises. We do not have, and never will have, income from advertising. However, I do believe there are other ways, within our reach, of doing it...and we already have some suggestions. Doubtless others will come out if we seriously put our minds to the problem.

I'd like to suggest a positive approach. By that, I don't mean that the problems should be ignored. I mean that if a project has merit—and this network proposal certainly seems to have it—we should proceed with the idea of finding ways to solve these problems.

One question which has been raised is that of using an exchange of taped programs in place of a live network, thus reducing wireline costs. We had several interesting observations on this matter, along with candidates' applications for this seminar. Briefly, let me say that the exchange of taped programs will reduce costs. It will also allow a higher range of audio frequencies to be trans-

PER CENT OF TOTAL TIME

Program Classification	Stations								Average All Stations
	A	B	C	D	E	F	G	H	
Religious	2.0	---	---	---	2.4	2.8	2.2	2.1	1.4
News	6.4	8.4	9.5	8.5	8.1	12.0	10.9	7.9	9.0
From Classroom	---	5.4	---	---	1.9	---	1.7	4.5	1.7
Music	51.6	55.0	47.7	44.0	56.9	43.2	48.3	61.5	51.1
Books	2.2	2.2	3.1	6.2	3.1	3.6	3.0	3.0	3.3
In-school Bcasts.	2.4	---	---	5.1	2.7	5.2	---	4.5	2.5
Recorded Commentary	8.2	9.4	10.5	5.1	3.3	8.0	6.2	2.1	6.6
Live Commentary	2.2	5.4	6.4	6.4	5.9	3.9	4.6	1.5	4.5
Sports	4.4	4.4	4.6	7.3	2.6	2.8	1.6	2.4	3.7 ?*
Farm	4.0	---	8.8	5.7	2.7	3.3	4.6	---	3.7
Home-makers	3.3	---	1.5	2.8	2.7	2.7	2.6	---	2.0
Variety	4.7	2.9	6.2	5.1	4.9	6.8	7.7	7.1	5.7
Talks - Lectures	---	1.5	1.0	---	1.4	---	1.0	2.4	0.9
Dramatic	---	2.2	---	---	1.2	1.1	---	1.2	0.7
Markets	7.3	---	---	---	---	1.0	2.1	---	1.3
Childrens	1.1	2.6	0.3	2.8	---	3.7	3.6	---	1.8
Medical & Health	0.2	0.7	0.3	1.1	---	---	---	---	0.3
Sports events Reported	2 hrs 30 min	2 hrs 5 min	3 hrs 15 min	3 hrs	2 hrs 45 min	1 hr	none	none	
NAEB Offerings	5.6	10.4	5.3	2.8	1.9	10.2	8.3	6.0	6.3

*The survey came at a time when some stations were carrying a lot of live football and basketball and others were carrying none.

Figure 11

mitted. On the other hand, I'd like to point out these facts: Several tape networks have been started and tried out by commercial stations. To my knowledge, most have been abandoned in favor of wireline networks. I believe the NAEB tape network to be the most successful venture of this type. With this in mind, I made a survey of eight prominent NAEB stations to determine the extent to which the NAEB tape network is used (Figure 11). Why is the average percentage of total broadcast time occupied by NAEB tape offerings only 6.3 per cent? I'm not sure I can answer that. There is an intangible something which sets a live network apart from all networks using taped or recorded programs.

As to quality of transmission, commercial networks have used wirelines since they started, and I have yet to hear of serious complaints—even with the best symphony orchestras. Of course, if you put FM reception of a live program using a well-engineered receiver and high-quality loud-speaker alongside the average so-called "hi-fi" AM receiver, you'll notice a difference—provided your ears are sensitive to high frequencies. But for day-by-day listening, wireline quality has been quite acceptable. Why not use FM relay? Fine, except there are vast areas where it just can't be done.

This I believe to be true: If educational radio does not move forward, it will move backward—and fast. We need something to give us a lift, and this live network proposal seems to be the answer. I dislike settling for something second-rate.

UNKNOWN: What about microwave relays?

MENZER: In many areas there are projects now under way to organize microwave relays for educational TV stations. There is no reason why an additional high-quality audio channel couldn't be added to such a microwave system allowing it to serve both radio and TV stations. Presently, until microwave systems develop, it looks like the wireline network is our best bet.

QUAYLE: How many hours of programing would we need for the network?

MENZER: In 1959 I made a survey of thirteen midwestern stations to find out what amount of programing might be available from those stations. I asked each manager to send me a program schedule and to underline those things which, in his judgment, were suitable for regional or national networking. I added to that the material which might be available from the present NAEB tape network service, plus material which might be available from other outside sources. We would need, roughly, 54 hours of program material each week. I found that we had over 170 hours available. Obviously a program produced by one station might be duplicated by another, but even if we cut this figure in half, we still have 85 hours—and we need only 54. (See Figure 11 for the average percentage of total time devoted to various categories by eight stations surveyed.)

QUAYLE: What about the use of Class C lines?

MENZER: Class C lines are a great deal lower in quality than Class A. For speech only, a relatively limited frequency band is required, but for music, I don't think our organization will settle for anything less than the best available. My figures are based on the best available.

FREDETTE: We have been using Class D facilities for strictly voice transmission. We have been very, very pleased with these facilities for voice-only programing. Are these facilities the same throughout the country, or do they vary in different areas?

RUSSLER: By and large, they should be the same all over the country. The types of facilities are different all over the country, but the frequency characteristics are about the same. A Class C line has a flat frequency characteristic between 200 and 3400 cycles. A Class A (or Class B) line has a flat frequency characteristic between 100 and 5000 cycles per second.

PRESS: What about piggybacking on the stratovision experiment? Would that offer any potential? Also how about investigating the possibility of using commercial network lines when they're not in use?

JANSKY: It seems to me that among the fundamental considerations which need to be explored before you determine costs is just how you're going to do this—either for regions or for nationwide networking.

I also have a question: What are the technical capabilities of the various systems available for interconnection?

1. Wire circuits.
2. Microwave relays.
3. VHF relays.
4. Simple interconnection of FM broadcast stations.
5. Multiplex circuits on FM broadcast stations.
6. Possible other systems that might be used.

And then, what are the costs involved in the use of different systems in specific cases?

MENZER: I have this information only from a limited area. (See Mr. Jansky's full presentation on page 58.) It was obtained from stations that were installed and operating. We found that it was impossible to carry on off-the-air network operation with stations in this midwestern area as they are now located.

VOGL: Would a wireline network using the equipment that you have indicated here be sufficient for this type of program? Or would it be necessary to run double lines and other additional equipment?

MENZER: The proposed system involves a basic round-robin network of stations which may transmit at any time. This basic network then feeds other stations on a one-way basis, and these stations may transmit by line reversal.

DUNN: This can be done and would not require any additional equipment if it were ordered that way.

VOGL: Would this require additional equipment at the individual stations?

DUNN: It would require investigation to see if you had the necessary facilities. If you needed additional equipment, there would be a charge over the minimal operating costs.

PETERSON: As I understand it, then, the problem on a round-robin broadcast would be avoiding feedback—which is entirely possible by using proper isolation between the speeches of the various persons involved. This can be done effectively by the use of earphones.

DREYFUS: The Class A line is a 5000-cycle line. I don't think that from a music standpoint this is worth two hoots.

MENZER: Well, all of the commercial network broadcasting has been done on Class A lines—and I have never heard of any serious complaints about the quality. It is, of course, a lower quality than 15 kc FM transmission, but commercial networks have never used anything better.

DREYFUS: Don't you think that audiences have gotten to the point where they expect university stations (particularly FM stations) to do a heck of a lot better cycle-wise than the AM commercial stations in terms of what they're putting out musically?

PAULU: I think that we have a very good point here. This is not an argument against a live, wire network, but if we decide to have a live network, the limitations on frequency range would have to be considered when programing music. A good deal of the interest in FM particularly derives from the fact that it is high fidelity.

MENZER: I would like to give you an example which may help: We broadcast stereo programs using our AM and FM stations. As far as frequency response is concerned, we find that the average listener uses an FM receiver which has much better quality than the AM receiver. There is obviously a considerable difference—but we have never had an indication from listeners that they notice this difference. The human ear is a rather poor measuring device.

ELLIS: If there is concern over the quality of music that could be transported on the network, wouldn't it be wiser to leave the music off the live network and put music on a tape network instead? If so, wouldn't it then be wiser to drop from Class A to Class C and effect a saving on the lines? This could then be applied to operating a tape network with the high-quality music which we seem to be seeking.

What is the difference in line costs between Class A and Class C? Would the saving be enough to be applied to a good tape network? I'm going on the assumption that most music is not timely and that most of it could be delayed as much as six months to a year.

MENZER: To use Class C lines would certainly limit network operations. I'm not sure that it would be worth it. And when you go down to Class D or E, there is a decided difference in speech transmission; transmission of music is very poor.

Interexchange Channels		
Schedule "AAA" (50-15000 CPS)		Monthly Charge per ALM
8 consecutive hours per day		$7.50
"AA" (50-8000 CPS)	8 hours	6.00
"A" (50-5000 CPS)	8 hours	4.50
	9 hours	4.75
	10 hours	5.00
	11 hours	5.25
	12 hours	5.40
	13 hours	5.55
	14 hours	5.70
	15 hours	5.85
	16 hours	6.00
Schedule "B" occasional service		
(50-5000 CPS)	per ALM per hour	$.15
	Each additional 1/4 hour	.0375
Schedule "C" (200-3400 CPS)		
Less than 24 hours	contract period (12 noon - 9 PM)	
1st hour or fraction		$1.50
each additional consecutive hour		.25
Period between 9 PM and 9 AM		
1st hour or fraction		.75
Each additional consecutive hour		.20
24 hours		4.00
Schedule "D" occasional (200-3400)	1st hour	.10
Each consecutive 15 minutes		.025

Figure 12

PAULU: Where do the Class B lines come in?

MENZER: A Class A line has certain characteristics and is rented for a certain period of time. A Class B line has the same characteristics, but it is rented on a one-time basis. Class C lines and Class D lines have similar characteristics, and a Class E line is about the same as that used for telephone conversations.

PAULU: What's the difference in cost between A and C?

NOVAK: There would be a saving of approximately $.50 per month per airline mile for an eight-hour day on the round-robin proposition. The networks are not set up on that basis.

We also have two other grades of line, AA and AAA, but these are quite expensive. (See Figures 12 and 13.)

Program Charges

		FCC 198
Station Connections		
Schedule A		
8 consecutive hours or fraction	per month	$55.00
1st 3 additional hours		3.00
12th consecutive hour on		2.00
Schedule B		
Fixed monthly charge		20.00
Each hour or fraction of use		1.75
Bridging Connections		
Schedule C		
Less than 24 hours per day contract	per month	15.00
Each additional consecutive hour to contract		1.50
Maximum charge (for 24 hour contract service)		20.00
Schedule D	per month	10.00
Schedule E	Minimum charge per month	10.00 (16 occasions)
	Each occasion over 16	.625
	Maximum charge	17.50
Local Channels		
Schedule F	all Bell exchanges except those listed on pg 33A FCC 198 others (NWB) per own filed tariff charges	

Figure 13

VOGL: Does the rate vary if there is a solid block of eight hours or if it is broken up into four 2-hour broadcasts?

NOVAK: The rate would be higher if it were segmented.

FREDETTE: How does the high frequency response go up when you reach AA and AAA?

DUNN: An AA line is flat to 8000 cycles, and an AAA line is flat to 15000 cycles.

UNKNOWN: On Class C, is it possible to break it down to an eight-hour day and get a reduction in cost?

DUNN: You might be able to pick some certain hours out of the day and come up with a lower figure. However, you would be safer to stay with the $4 per mile than to branch off.

PAULU: Suppose I broadcast four hours during the day and then four hours from 7 p.m. to 11 p.m. in the evening, on Class A. How much difference in cost would there be between that and if I broadcast eight consecutive hours?

DUNN: If you're talking about a spread of fourteen hours, with a gap, your base rate will still go to eight hours—and you'll pay for sixteen-hour service.

PAULU: In other words, it would be doubled.

DUNN: No, if you go to sixteen hours consecutively, you will pay about $6.50 per mile. It would be less costly to you to charge you through these blank periods than to start over with another eight-hour cost, which would take you automatically to $9.

FREDETTE: Is the physical wire the same whether the service is Class A or Class C? In other words, if I were receiving Class C service and I wanted AAA service for two hours on a certain day, could you give me this service?

RUSSLER: No, it wouldn't be that easy. The physical characteristics are entirely different.

JACK STIEHL, WHA: Do you make any minimum noise and distortion guarantees?

RUSSLER: We have our own limits which we use and which have always been satisfactory.

DeCAMP: It isn't always the frequency response of the line that's most important. It's frequently the signal-to-noise ratio.

FRYMIRE: If a program is being carried on the lines of a small independent telephone company at the point of origin, while at the point of reception it is being carried on the lines of a large metropolitan telephone company, what will be the effect on the quality of the broadcast?

RUSSLER: In general the quality should be about the same. If necessary, there might even be special construction to build up that plant of the independent company—because if a service is ordered from us and if it is made up of facilities gathered from various companies, one of which has low-grade facilities, then the whole layout may be affected. To solve this, you could either degrade the whole network to match the low-grade facility and put up with the loss you would get from the low-grade area—or you could raise the low-grade area to match the high-grade one.

KAGER: Is there a minimum charge per month per mile regardless of how much permanent line is used per day? I am thinking in terms of one hour per day, perhaps three times a week.

DUNN: One hour a day costs you $.15 a mile for A facilities or $.45 a mile per week, which would be about $1.80 for thirteen hours of broadcasting.

BROWNE: We have not yet received a satisfactory answer to the question comparing lines, microwave systems, VHF transmission systems, etc. All our emphasis is on lines. Do we already know that they are the only thing that will work?

MENZER: I can give you a partial answer. I have investigated the possibility of using a microwave relay system, whose use is envisioned for both radio and TV. The nearest answer I could get was that, for the midwestern area previously used as an example, it would cost in the area of $100,000 to make a survey to determine what facilities were necessary. The closest estimate anyone would make of the cost of the microwave equipment for radio and TV was $2,000,000.

FRYMIRE: The best figures for both radio and TV microwave costs are contained in the NAEB Washington seminar report, The Feasibility and Role of State and Regional Networks in Educational Broadcasting.

UNKNOWN: You could buy a microwave transmitter for $4500 for radio only.

UNKNOWN: Did you say that you had looked into the off-the-air pickup and that it is impossible?

MENZER: It is in some midwestern areas because the hops are too long.

GUNN: Have you considered that the top half (Detroit through Michigan and Wisconsin to Minneapolis) of the network might be by air relay and the bottom half (Iowa to Ohio) by wire?

MENZER: That is a possibility, but it needs to be investigated.

R. HILL: That TV microwave setup which is presented in the Washington report is likely to be a reality, and there's no reason why we couldn't piggyback on it.

PRESS: If it is feasible to use stratovision to transmit radio network programs to the Midwest—and if the people in the Midwest Program on Airborne Television Instruction could tell us more about their plans—we might experiment with it at very low cost, since they are going to do it anyway.

HARRISON: Does the figure of $17,500 in your paper, Carl, include all the local channels and interconnections?

MENZER: Yes, it does.

radio network financing

by

Larry Frymire

Here are some possibilities I think we should consider when thinking about financing a live radio network:

1. Self-support. Pro-rated participation fee based upon transmitter power, multiple transmitters (AM-FM combinations), and population in local coverage area—not on mileage separation between network points.

2. Self-support. Pro-rated participation fee based upon number of hours or minutes of programs provided for the network by participating stations.

3. Regional support. Each network region paying participating fee as pro-rated upon number of stations within given region. Example: Present NAEB Region III members would pay 1/41 of network costs within the region, provided all members joined the network. Fees would be proportionately higher with fewer members.

4. Foundation support.

Year 1 - 100%
Year 2 - 75% (members contributing 25%)
Year 3 - 50% (members contributing 50%)
Year 4 - 25% (members contributing 75%)
Year 5 - 0% (members contributing 100%)
Or any one of several variations of the above.

5. Federal support. Possible sources: National Defense Education Act; special legislation to provide a special budget for U.S. Office of Education.

6. State support. Enlist the aid of state groups to foster legislation to provide financing within the individual state for network participation.

7. Long-run budget saving. After the initial fee has been paid, the total station production and engineering costs could be reduced. For example, fifty program hours per week supplied by the network could mean many more than fifty hours per week released from engineering and production costs.

8. Income possibilities provided by closed-circuit service of network. Example: Medical school seminars. Each participant would pay the local member station for the use of this facility. This income could be applied to the total fee.

Following are excerpts from several sections of the Washington seminar report on networking, which was mentioned before.

REGIONAL OVERVIEW – THE MIDWEST: RADIO[1]

. . . In the spring of 1959 a survey of some thirty-seven educational broadcasters throughout the country revealed the following information:

Alabama--------- Nothing that resembles a radio network.

Arizona --------- No educational radio stations on the air, merely two production centers—at Arizona State University, Tempe, and the University of Arizona, Flagstaff. No exchange of programs with other educational institutions.

California------- No formal arrangement for the sharing of educational materials among stations in the area. KPFA, Berkeley, "informally" exchanges programs via tape with several broadcasters in and beyond California. KPFK, Los Angeles, sister station to KPFA, will eventually be tied in to a mid-state relay station, which will permit actual "networking," perhaps within the next year. Local networks are feasible in California since both the number and proximity of transmitters could develop true network-type operations, given sufficient funds.

Colorado--------- No coordinated activity exists in any of the institutions of the state.

Florida--------- Discussion has taken place toward implementing interchange of programs. Nothing tangible to report as yet. Only occasional exchanges of programs between the University of Florida, Florida State University, and Miami Public School facilities.

Illinois---------- WILL, University of Illinois, has exchanged programs via tape with WBAA, Purdue University. Also WILL has rebroadcast the WBAA signal for baseball broadcasts.

The University Broadcasting Association, Chicago, has arranged for the cooperative production of ETV programs and has worked in the area of sharing time on commercial stations and in some cases has arranged for personnel in "Viewpoint," a radio series over a commercial station. Illinois Institute of Technology operates a production center which has distributed tape programs to midwestern university and college stations. The University of Chicago, exclusive of the NAEB network, sends tapes of some of its programs all over the country. No formal arrangements have been established in the state to arrange for extensive sharing of programs either via tape or by live networking.

Indiana---------- WFIU, Indiana University, is the key station for all varsity football games and feeds this material to almost all of Indiana's commercial FM stations air-to-air. AM stations also pick up the nearest FM signals and extend the "network" to nearly every area of the state. "Indiana School of the Sky" taped radio series are used by twenty educational and commercial stations. The many school-owned low-power FM stations do not participate in any sharing of programing. WBAA, Purdue University, maintains a tape program service to all other school stations in the state. A newly developed FM station at Purdue will soon be available for live FM air-to-air programing relay within NAEB Region III.

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[1] Lawrence Frymire, "Regional Overview—The Midwest: Radio," in The Feasibility and Role of State and Regional Networks in Educational Broadcasting (Washington, D.C., 1959), pages 163-168.

Iowa------------ There has been no educational network as such in the state. In the past the State University of Iowa, Iowa State College, and Iowa State Teachers College have cooperated in the production of two weekly broadcasts in the general area of child development. This activity ended in 1953. WOI, Iowa State College, carries daily half-hour in-school programs originated and tape recorded at Iowa State Teachers College, as well as a weekly musical series. Drake University, Grinnell College, and Central College also supply regular taped series for WOI. Public school stations do not exchange programs but do serve local commercial stations.

Kansas---------- No programing exchange occurs other than that supplied by educational outlets for local commercial station rebroadcast on tape.

Kentucky-------- No exchange between educational broadcasters, though WBKY, University of Kentucky, does serve commercial broadcasters with farm and home programs.

Michigan-------- Along with the northeastern states, Michigan is now active in providing an educational network service to listeners. As long ago as 1949, Michigan State University and the University of Michigan radio facilities joined with those in Wisconsin in the experimental extension of programs via direct air-to-air FM relay. However, within the last year a program service on a regular basis has been established. While this is a limited effort at present, the activity has served to prove the possibility of "networking" and, from all indications, the activity will be enlarged in the near future.

There is now a weekly half-hour news-in-depth feature being carried by WKAR-FM, Michigan State University; WUOM, University of Michigan; WDET, Wayne State University; and WMCR, Western Michigan University. WKAR-AM also carries the program. FM air-to-air relay is employed, with all four stations originating a segment of the program each week. A convenient geographical pattern enables WDET and WMCR to monitor WUOM and WKAR-FM respectively. WUOM and WKAR-FM handle the switching arrangements by means of special FM receivers. For eight weeks this summer, WKAR-FM served as the originating station for three hour-long live concerts from the National Music Camp at Interlochen, Michigan. WUOM, WMCR, and WDET all carried all or part of the concerts, as their schedules permitted. The National Music Camp provides the line to WKAR-FM and there is the possibility that another year may bring extension of this Interlochen network by means of leased lines to other midwestern radio stations. This could develop into a combination FM relay and land-line network service to a five-state area. Details are being worked out.

WKAR, Michigan State University, and WUOM, University of Michigan, provide program series as well as special features to many midwestern university stations on a regular basis. This is by tape recording. Also these stations exchange some programs via tape with the other Michigan educational stations. Wayne State University, Western Michigan University, and the University of Detroit provide taped series upon request. An unusually large and comprehensive service is provided for the public schools of the state as well as the commercial broadcasters—again by tape recording.

Minnesota------- KUOM, University of Minnesota, has occasionally made its facilities available for both live and tape programing from Macalester College in St. Paul. Special affairs at the university are recorded and supplied to midwestern university and college stations.

Missouri-------- No formal or regular exchange of programs exists in the state. Public school broadcasters do supply programs to commercial stations and for NAEB distribution nationally.

Nebraska-------- There is no exchange of program material in the state.

New Mexico------No exchange of program material in the state. Taped series are provided for KANW, Albuquerque Public Schools, by several educational university stations. This is taped material for in-school use only.

New York--------. . . the Empire state FM School of the Air is a network of nineteen commercial stations using a daily thirty-minute in-school program. The proposed Educational FM Radio Network for the Northeast United States . . . represents a major breakthrough toward true "networking" among educational broadcasters in the region.

North Dakota-----No program exchange exists. KFJM, University of North Dakota, reports keen desire for the development of "networking" in the future.

Ohio-------------. . . WOSU, Ohio State University, and the FM station operated by the Toledo Public Schools are active participants in plans for possible NAEB Region III live FM relay. The extensive Ohio state university system operates several FM stations in addition to the one at Ohio State University.

Oklahoma-------- No program exchange exists. There has been some tape exchange between the University of Oklahoma and Oklahoma State University. Possibility exists of two-way sharing of facilities between WNAD, University of Oklahoma, and KOKH-FM, Oklahoma City public schools.

South Dakota----- No program exchange exists. KUSD, State University of South Dakota, is the only educational radio operation in the state.

Tennessee------- No program exchange exists. WUOT, University of Tennessee, offers service to commercial broadcasters.

Texas----------- University of Texas production unit has supplied several series of programs, via tape, to educational stations throughout the country. No program exchange exists between Texas educational broadcasters other than special series provided for the in-school stations within the state. Also taped series are supplied to schools for closed-circuit distribution as they may exist.

KUHF, University of Houston, has participated in an exchange of tape program materials with other state production centers.

Washington------ No program exchange exists other than taped programs provided on an occasional basis for exchange between the Portland Public School station, the University of Washington, and the State College of Washington.

Most of the preceding information has referred to regular or systematic program exchange. It is abundantly clear that there is very little program exchange among educational radio broadcasters. This should not be misinterpreted as lack of ability to produce high-quality programs or a lack of interest among educational radio operators to participate in such an exchange. The highly successful NAEB tape network has served to take over a major portion of exchangeable material.

Also, there seems to prevail across the country a policy of serving local commercial broadcasters. Again, this should not be misinterpreted as indicating a preference to serve our commercial brethren, but here again, the NAEB tape network service has been depended upon by individual educational broadcasters as the means of obtaining program materials from other educational broadcasters. Also, it should be pointed out that a great number of educational radio operations have come into being since World War II and especially within the last decade, but for a considerable number of years prior to the origination of these stations, the educational institutions of this country were servicing commercial broadcasters. This "habit" of serving local commercial broadcasters has given educational broadcasters a strong voice in many communities. It has also, I believe, been one reason why we have not shared our resources more among ourselves.

However, as educational radio gains a greater identity, its desire will grow to cooperate with other educational broadcasters. Increased program staffs, enlarged operations, even more institutions operating broadcast outlets. . . these will result in producing a more significant body of program material and will make possible the joining together of many areas and regions of our country into "networks" of many kinds. Perhaps, with the proper promotion and development, a truly national educational radio network might come into being. . . .Various areas of the country are now being served, or soon will be served, by educational networks. It seems evident that these activities will become enlarged in the near future and gradually will spread their way across the nation.

A hopeful but modest beginning has occurred. There remain the physical and financial and legal problems of getting programs from one state to another. More equipment, more stations, more people in educational broadcasting, and certainly a significantly large sum of money, will be required to make educational live "networks" possible.

The northeastern United States and those states surrounding or close to the Great Lakes contain the heaviest concentration of both stations and personnel, as well as program and financial resources. I suggest that there is sufficient interest in these regions now to warrant immediate exploitation.

There are many advantages to a live network service to educational radio stations. Most obvious is the extension to other areas of the services of great teachers available in only some of the areas at present. First-class basic educational programs at both the in-school and adult levels could be brought to a mass audience at important moments in our social and economic life. Local production staffs could spend more time in developing quality programs for local as well as network use, if they were freed from maintaining large program time segments locally. Program services could be greatly enlarged if local stations could use network services. Such an expansion of program services could in the long run become possible at only a fraction of the cost of producing an equivalent number of programs in individual studios. Certainly the immediacy and universal characteristics of radio could be exploited to a greater degree, given network service.

Many persons and groups are actively interested in the development of "network" service in educational radio. Information gathered by the engineering committee and various regional committees, as well as the research committee of the NAEB, serves to point up the fact that "networking" is possible, desirable, and sought for by educational radio broadcasters throughout the United States.

CLOSE-UP: WISCONSIN RADIO[2]

From the time of radio's earliest beginnings, the state of Wisconsin has seen in this instrument great potentials for education and public service. Since 1919, when experimental station 9XM began regularly scheduled telephonic broadcasting, the University of Wisconsin has used radio as a means of extending its service to the state. In 1922 the call letters WHA were assigned.

In its more than forty years of operation, WHA has evolved into a force which gives the university and other divisions of the state their most constant, frequent, and immediate contact with the citizens of Wisconsin. But it was not until the construction of the state FM network, which extended WHA programs to every county in the state, that such a force came into being.

History and Development

Actually, the FM network was preceded by an AM network of sorts. WHA, in Madison, was linked by line to Station WLBL, Stevens Point, in the north central part of the state. This station, which has been operated since 1922 by the state department of agriculture, rebroadcast the "School of the Air" programs originated in Madison and the "Daily Homemakers" and "Farm" programs. The combined coverage of both AM stations, however, failed to provide for many areas of the state.

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[2] William G. Harley, "Close-up: Wisconsin Radio," in The Feasibility and Role of State and Regional Networks in Educational Broadcasting (Washington, D.C., 1959), pages 187-192.

Moreover, since both were daytime-only stations, they were unable to serve the thousands of citizens who, because of work or other commitments, were unable to listen during daylight hours.

Efforts to secure better channel assignments to expand power and hours proved futile. Then came FM with its static-free, high-fidelity qualities, and possibilities of providing a solution for Wisconsin's frustration in radio—limited coverage and limited hours.

The decision of the FCC to set aside a portion of the FM spectrum for education gave Wisconsin an assignment of eight channels reserved for noncommercial, educational use. Based on these assignments, engineers came up with a plan for a network of FM stations connected by off-the-air relay that would provide service over the entire state. Administrators, studying the plan and weighing all the factors, made the considered judgment to put Wisconsin eggs for radio development into the FM basket. They began a campaign to activate the plan.

In 1945 the state legislature took action on a proposal creating the State Radio Council, a public body representing a wide range of interests and public services, whose purpose was to "plan, conduct, and develop a state system of radio broadcasting for the presentation of educational, informational, and public service programs," and appropriating funds for two FM stations.

The initial station, WHA-FM, went on the air March 30, 1947.

Successive legislatures provided for two additional stations each biennium until in 1952 the last two stations were constructed and the network of eight FM stations was completed. This gave Wisconsin the nation's first (and only to date) state-wide noncommercial radio network.

Facilities

Combined with the two AM stations, the FM network provides a state-wide broadcasting service of ten stations:

WHA-FM	3 kw	Madison
WHAD	10 kw	Delafield
WHKW	10 kw	Chilton
WHRM	10 kw	Rib Mountain
WAWC	10 kw	Colfax
WHWC	7 1/2 kw	West Salem
WHHI	10 kw	Highland
WHSA	10 kw	Brule
WHA(AM)	5 kw	Madison
WLBL(AM)	5 kw	Stevens Point

Transmitter sites were based on height above surrounding terrain and the possibility of using existing state-owned land. In three instances, transmitters were located in state parks.

The entire network (with minor exceptions) is programed from Madison, with the broadcasts originating in Radio Hall on the campus of the university. WHA-FM serves as the key station with the programs being transmitted from one station to the next via off-the-air pickup, and rebroadcast. In case of failure of a link in the chain, the direction of pickup can be reversed or various cross connections utilized.

To take care of power failures, each station is equipped with an emergency gasoline-driven power generator. WHA-FM, as the originating station, has a duplicate stand-by transmitter which can be put into service within forty seconds.

Although in the beginning it was thought that studio facilities might be needed at some of the state colleges, this did not turn out to be necessary. The advent of audiotape, with the flexibility it provided of obtaining programs from all over the state and shipping them to Madison for insertion in the schedule, proved to offer a more practical and satisfactory means of obtaining program materials from around the state.

Program Service

By extending the voice of the university, the network has truly implemented the university's slogan "The boundaries of the campus are the boundaries of the state." Further, the radio network has proved a cohesive force in bringing the state government closer to the people and the people closer to their government. Whereas before, the people on the borders were being drawn away from the university by the attraction of listening to radio programs emanating from Minneapolis, Dubuque, and Chicago, the availability of the Wisconsin State Broadcasting Service in all parts of the state has tended to cement state loyalty and draw Wisconsin citizens into an even more intimate relationship with their state and university.

The FM network is currently on the air from 7:15 a.m. to 10:30 p.m., Monday through Friday, and ten hours on Sunday, for a total each week of 83 3/4 hours. The schedule is a diversified one providing offerings to meet a variety of needs and interests.

The network seeks to serve agriculture, by furnishing vocational and market information; households, by furnishing information on care and conduct of the home; schools, by supplementing the instruction with specialized teaching talent; adults, by furnishing educational and cultural opportunities not otherwise available; public agencies, by providing means for extending their services directly to the people; informed public opinion, through discussion of questions of public policy.

The network does not attempt to serve all of the people all of the time—but rather some of the people especially well all of the time. The result is a unique service, built especially for minority audiences which are not otherwise well served by radio.

The program structure is designed especially for the people of Wisconsin. The network has no regular national wire network connection, though outstanding programs from other educational institutions are available from the NAEB tape network.

Prominent in the program schedule are the "Wisconsin School of the Air" (supplementary programs for elementary school classroom teaching), the "Wisconsin College of the Air" (university classroom lectures and specially planned studio courses), "Farm Program" (market and farm information), "Homemakers Program" (a daily broadcast for women of news, commentary, and information), a generous portion of good music in four daily concerts, and a wide variety of other features emanating through state organizations and agencies as well as national sources.

Impact of Network Feature

Four types of program activity indicate the importance of the network feature—the simultaneous state-wide transmission—to the program service.

Politics and Government-

A unique service of the network is the long-standing program of political education. All qualified candidates for state and elective office in the primary elections are allowed free time to state their cases—thus permitting all candidates, regardless of their financial resources, to speak to the citizens of the state. In the regular election forum, time is equitably allocated to the parties and independent candidates.

Every weekday during sessions of the state legislature, legislators are given an opportunity to report to their constituents back home via broadcasts direct from a special studio in the state capitol. In addition, frequent actuality reports are made of legislative hearings so that radio enables citizens to listen in on an important part of the legislative process.

Thus the network gives legislators an opportunity to tell what they will do if elected; and if elected, to report on what they are doing.

The Wisconsin School of the Air-

Next week [September, 1959] the "Wisconsin School of the Air" will begin its twenty-ninth year of supplementing instruction in the elementary grades of schools all over Wisconsin. Based on last year's figures, nearly 300,000 youngsters will listen each week to an average of two and one-half programs brought into their schoolrooms by the nearest station of the state radio network. Ten programs will be offered in subjects ranging from experimental science and American history to foreign languages and creative art. In the "Let's Sing" program, for example, 100,000 youngsters will raise their voices together as they follow the professor's direction from the studio in Madison.

Weather and Highway Information–

Service reports dealing with road, weather, and emergency situations are provided daily. Such information, official and up-to-the-minute, is used by farmers, fruit growers, travelers, truckers, flyers, and others whose activities are affected by the weather.

Besides the AAA road-condition reports and the regular U.S. Weather Bureau direct reports from Truax Field in Madison, the network presents a unique weather roundup twice daily utilizing state-station operators to report current conditions at their respective transmitter sites. These reports are followed by a summary and interpretation by a U.S. meteorologist.

Sports Broadcasts and Special Events–

Through arrangements with the university athletic department, broadcasts are originated by WHA for all football and basketball games both at home and away. Not only are these programs available from the state network, but many commercial stations in Wisconsin and surrounding states carry the game reports. By means of off-the-air pickup from the nearest state FM transmitter, stations in remote areas of Wisconsin have available to them programs they could not afford if obliged to pay broadcast line charges. In this way programs from the campus—including "School of the Air," farm and homemakers' programs, weather and market information, and special events such as U. W. commencement, convocations, and special concerts—are generally available throughout the state.

The Wisconsin College of the Air

This title covers the organized courses and series of programs constituting the systematic instructional programs for adults. Included are regular university courses originating from campus classrooms and specially prepared series presented from the studios of Radio Hall.

Such courses provide adults the opportunity of going to college at home. Together with the broadcasts of concerts by the Pro Arte Quartet, in residence on the campus, and many other musical groups, there are presentations of special lectures and convocations, interviews with foreign visitors and national figures, and frequent discussions and interpretations of current issues by faculty scholars and experts. Through these, the people of the whole state share by radio in the many resources available to the university community.

Administration

The State Radio Council consists of nine members: the governor or his representative, the president of the University of Wisconsin or his representative, the superintendent of public instruction, the secretary of the Board of Regents of State Colleges, the director of the State Board of Vocational and Adult Education, and three citizen members appointed by the governor. Thus the council represents the entire educational establishment of the state, plus the general public.

The responsibility of the state radio program service is shared by the council and the university. The university provides programs for its daytime AM station, WHA. The council, which operates eight full-time FM stations plus WLBL, uses the daytime programs of WHA and produces its own programs for the evening hours. Both agencies recognize that they are contributing to the same over-all project and the relationship is a harmonious one with all stations carrying the same service. The council looks to the university for its contributions to the program service, and the university looks to the council for transmission facilities over which the programs can be heard throughout the state.

The program activities are coordinated through the sharing of the appointments of key administrative personnel by the university and the council. In addition WHA studios and offices in Radio

Hall are shared with the council. This makes for efficient operation and avoids duplication of equipment, facilities, and personnel.

Costs

Current appropriations for operation and maintenance of the state radio stations are as follows:

Station WHA (University of Wisconsin)	$185,000
8 FM stations and WLBL (Radio Council)	$240,000
	$425,000

The WHA budget includes the program staff of the "School of the Air" and other program and administrative personnel engaged in the production of programs originated by WHA—hence the seeming disparity.

Annual operating costs for the state radio service, on a per capita basis, are less than ten cents per person to Wisconsin citizens—the tax on a gallon and a half of gasoline, or the cost of a third of a package of cigarettes.

The physical plant of the ten stations represents a capital investment of approximately $600,000. WHA and WLBL were built up gradually through the years. The FM station appropriations total $488,095. The investment for physical facilities capable of serving virtually all of the 3,800,000 inhabitants of the state is, accordingly, less than eighteen cents per person. The cost of constructing the state radio network is the same as the current cost of construction for a school to house five hundred students, a small fraction of the numbers served by radio.

Personnel

Five administrative and technical personnel hold joint appointments between the university and the council.

Other employees on the council payroll last year included 21 full-time civil service workers (mainly transmitter operators) and 12 part-time workers. The WHA staff included 23 full-time employees (6 faculty, 17 civil service) and 8 part-time student workers.

Listener Approval

How many citizens are served by the state's radio programs? There is no exact answer. We have, however, indications of listener approval.

"Wisconsin School of the Air" enrollments have risen steadily through the years to a high last year of 711,273.

Listeners' fan mail provides another index of interest and approval. Listener mail, which fell off only slightly during the five years of television's major growth, has begun to climb back up, and last year totaled 20,462 letters or cards.

Truly, Wisconsin's radio network would have gladdened the heart of an early president of the university who said, "I shall never rest content until the beneficent influences of the University of Wisconsin are available to every home in the state." The State Broadcasting Service, by extending the service of University Station WHA, has successfully implemented that dream beyond his wildest imaginings.

COSTS[3]

. . . There is no such thing as a "standard" cost for state or regional network operation.

I think those of us who have worked in this area, particularly if we have ever been responsible for the construction of educational radio or television stations, know there are no standard costs in the construction of stations, either. While it is true that the cost of a microwave link, a television or radio receiver, antenna, and similar pieces of network equipment is approximately the same no matter where you are, the total system involved in each state or regional network is a matter of custom design; therefore, it is almost impossible to arrive at standard cost data to fit every situation. The total cost of a network depends, among other things, upon the type and design of system selected, the number of equipment units required, and availability of surplus equipment, power, buildings, land, personnel, and other facilities and services at little or no cost.

In many areas we can find such things as equipment, buildings, and land that can be furnished to us for a very small cost—in many instances at no cost at all—and this means that cost data which anyone might provide you would more likely be misleading than anything else, although a little later on I'd like to give you some examples of the type of costs that we have run into in setting up our network.

I feel that it may be more helpful to outline first some of the factors or cost considerations that go into the design and operation of a network. This list of cost factors is not an exhaustive one, but I hope you will find that it suggests some areas for discussion. There seem to me to be three basic cost areas: development, equipment and installation, and operation.

In the area of developmental costs, one of the major items is administrative expense. A large part of the administrative expense in developing a network goes into the executive time required to get the project started and planning under way. In most organizations this probably will not be an out-of-pocket expense, but rather it will be absorbed by the organization. This is a euphemism in the accounting world, for "The boss will work overtime at no increase in salary." Nevertheless, it is well to consider the requirements for executive time in your planning because if you are going to administer the development and establishment of the network, you must plan on using not only much of your spare time, but also time diverted from your regular duties. This may mean that certain of your activities will have to be transferred elsewhere or temporarily set aside.

As you look further into the cost of development, you will find that many direct out-of-pocket expenses such as long-distance telephone and telegraph, travel, and conference costs, come very quickly to the fore. A large part of your time will be spent in visiting and talking to interested people across the state or region. These conferences should help you to determine the objectives and scope of the network. Answers must be found to such questions as: What is the purpose of the network? What is to be its coverage? Where are programs to originate? Such information is essential if costs are to be controlled.

If the planning has been carefully done, it should provide intelligent and useful information for the next phase of developmental activity—engineering and legal surveys. If you have an engineer on your staff, or an engineer available from a local station who is familiar with the problem of network systems, you may want to bring him in for a thorough discussion of the project. Otherwise, I would recommend that one of the most economical expenditures you can make in the long run is the hiring of a first-rate consulting engineer. The cost will depend upon the amount of his time required, as well as his expenses for travel, drafting work, map making, etc. There is no question but that a man with thorough engineering knowledge of network systems can save you more money than his fee. Even if your own engineers do all or most of the work, it is helpful to have their calculations reviewed by a consulting engineer, particularly with regard to matters involving the FCC and frequency allocations.

At the appropriate time you will also need competent legal advice concerning such matters as the acquisition of land, buildings, rights of way, etc., as well as advice in connection with applications to the FCC for broadcast facilities that may be needed.

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[3] Hartford N. Gunn, Jr., "Costs," in The Feasibility and Role of State and Regional Networks in Educational Broadcasting (Washington, D.C., 1959), pages 207-210.

One of the most valuable services performed by the engineers and lawyers will be their assistance in helping you to determine the total cost of the network system. It will be necessary to decide what type of system will be used: telephone company facilities, your own microwave setup, off-the-air rebroadcast from existing or new stations, videotape and/or audiotape recordings and distribution, or possibly one of the new methods such as scatter transmission, stratovision, earth satellite. Other decisions to be made are the exact route of the network, the amount of money available, whether it is to be a one-way or two-way system, origination and non-origination points, attended or unattended technical operation, one-channel or multi-channel transmission, and so forth. It should be possible with this information and the assistance of your legal and engineering consultants to establish a detailed budget for the project. A budget is an extremely valuable tool in controlling costs.

After this developmental work, the next major cost item is equipment and installation. In some cases this will be a very nominal expense, particularly if it is to be an off-the-air radio relay network and/or can be done with existing equipment. In other cases the equipment required will be extremely elaborate and complex with an appropriate price tag. Then, too, you may have to acquire land, put up buildings, provide power, and such.

The third major area of expense is incurred in the actual operation of the network. First are technical expenses—such as personnel, power, tubes, and parts—connected with the operation, maintenance, and replacement of equipment. Second are costs stemming from coordination and administration, including travel, personnel, and telephone and telegraph. If the number of programs exchanged, the number of originating stations, and the complexity of the programing is too great an administrative load for the existing staffs of the participating stations, then the network must employ its own staff—beginning first with a traffic manager, then adding a program manager, chief engineer, general manager, and secretarial assistance. . . . The costs involved in the operation of a central office. . .can become a major and yet necessary expense.

As the network grows, program expenses may increase as well. Although a cooperative network in which a number of stations contribute programing should mean lower program costs per station, there may be a tendency toward larger, more elaborate and more costly productions. Also, there may be certain out-of-pocket expenses for additional fees which become mandatory when special talent, copyrighted materials, etc., are broadcast over more than one station.

Having reviewed the establishment of our four-station off-the-air FM radio network in New England, we found that our developmental costs were approximately $3,000. Most of this sum was spent on engineering surveys to find FM frequencies that would permit off-the-air relay without interference. The remainder was for travel and conferences with executivies of the other stations to plan and establish the network. Over and above the $3,000 for development, endless man-hours of executive time were devoted to the project. In many cases other station activities had to be curtailed so that more time could be made available to build the network. Approximately $1,500 was spent on equipment and installation. This went mainly for the purchase of first-class FM receivers and high-gain all-weather antennas.

Because this is an off-the-air radio relay network, the operating costs are extremely low. Equipment operation expenses are, in fact, virtually negligible—probably less than $200 per year. The coördinating costs, excluding the time of regular station personnel involved in network administration, probably does not exceed $1,000 per year. Because of the size and simplicity of the network, there are no full-time personnel employed in its operation.

While our program costs as the principal network originating station went up several hundred dollars over our regular budget, the other network stations, which relied heavily on our programs, enjoyed an effective saving of approximately $50,000 over what they would have spent if they operated with the same programing on an independent basis.

Our experience with the two-station New England Educational Television Network using off-the-air relay is quite similar to that of our radio network. Developmental cost ran several hundred dollars, equipment and installation approximately $2,000, equipment operation less than $300, coordinating costs approximately $1,000 per year, and program costs roughly the same as the radio network.

This will give you some idea of what limited off-the-air networks involve in terms of cost. Unfortunately, such networks are not feasible in many areas because of the great distances and areas involved or the lack of properly located educational stations.

There are some rules of thumb or generalizations which I have found helpful. In closing I pass them along in the hope that they may be useful to you in establishing and controlling network costs:

1. Do not accept someone else's cost data, but rather, benefiting from their mistakes and observations, make a complete study of your needs and establish costs to fit your own network design.

2. Think through very carefully the objectives of your network. Ask yourself such questions as: Is instantaneous transmission required or desirable? What area do we want to serve? What area must we serve to be effective and to enjoy adequate support?

3. Prepare a detailed budget as soon as possible and use it to control costs. Do not put it underneath the blotter or slide it in the drawer and forget about it until you're in trouble.

4. Seek and use experienced and competent technical and legal help and advice.

5. To the maximum extent possible, draw upon existing resources such as state land, surplus equipment, personnel from your own station and/or from commercial stations where appropriate.

6. Consider executive time when computing costs.

7. Consider and weigh carefully alternate methods and systems of networking. While you may have in mind, when you start, a particular system which you think is ideal, it's extremely helpful—if for no other reason than that I feel it helps to advance your argument to the legislature or groups you must go to for your financing—if you have considered the other ways, the other methods of networking, even if you decide in the long run that they are not practicable for your particular operation.

8. Provide adequate time and staff for proper coordination of the network.

9. Consider the impact of the network on your own programing, costs, schedules, personnel, etc. Be sure you know what it is going to do to your own operation before you embark on an extensive network undertaking.

10. Utilize the benefits of a network to the fullest extent, taking advantage of the new and better programs, the additional programs, and the greater publicity and coverage made possible by networking.

11. Think long range. Plan and design your network with the idea of future interconnection with adjacent states and regions. This will minimize problems in the future and maximize the rewards and benefits of network operation.

ADMINISTRATION PROBLEMS[4]

Several years ago I had the privilege of covering the whole country in a survey for the National Educational Television and Radio Center. I looked at closed-circuit stations, on-the-air stations, and all the rest, and in the evaluation section of the little summary report I wrote on it, I said the following:

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[4] Richard B. Hull, "Administration Problems," in The Feasibility and Role of State and Regional Networks in Educational Broadcasting (Washington, D.C., 1959), pages 223-227.

"Any effort to evaluate the total educational television development is difficult and is likely to be dogmatic. The multiplicity of purposes, activities, and installations which the term 'educational television' now serves to describe, does not lend itself to easy generalization. Like the blind man and the elephant, each participant and each critic in educational television tends to think the part with which he is familiar is the educational television totality, and that his own ground rules and his own case situation is universal. The fact that there may be several educational television elephants may escape him altogether.

"Since the term first appeared in the late forties, the term 'educational television' has become ambiguous and created confusion and difficulty. As a crusader's criterion it may have been excellent; as a basis for formulating television and broadcast policy in education it's almost useless.

"Education is a complex of processes and purposes. Television is a technical facility with a capacity to transmit sound and sight images. It may be used by education (commerce, industry, business) for many and various purposes whose requirements may and do vary greatly."

This same kind of evaluation applies to television and radio networks.

Now, I stress that, because the undertones I have caught . . . illustrate to me exactly this kind of confusion. A person who is classroom-oriented has all his fears and concerns about a network in terms of what this may do to the status-quo situation of the classroom.

I remind you that, as far as television goes, the idea of using it as an instrument for total instruction or direct instruction or instruction in quantity is only one phase of the development.

For more than thirty-five years there have been efforts in this country to create minority, alternative broadcast services, first in radio, then in television, and the networking concerns of that particular application have nothing at all to do with formal instruction. They are not alternative to each other. They are complementary to one another.

Now, I remind you again, a network is merely a technical device, and the utilizations to which it may be put are almost endless. It's quite natural to think in terms of the application and not the possible applications, and to criticize what one might imagine is going to be done with a network in terms of some image already existent.

For years we have talked about American radio or television, British radio or television, Russian radio or television, and these are not totalities. They are simply a given application of a particular technical facility.

Now, within this country is NBC a network or is NBC a program service? The program service is the function. And the actual NBC network consists of six stations which NBC owns. The rest of the network, other people own, and they take or deny NBC programs as they choose.

The Mutual network is one which more closely parallels our adult education efforts in terms of radio broadcasting and television broadcasting—a mutual type of broadcasting structure.

But all of you are familiar with baseball networks. Throughout the Middle West there have been temporary hookups of FM stations for afternoons only for the period of a summer. Now, is this a network? or is this a linkage? or what is it? That is a pro tem sort of thing.

In Ohio, once or twice a year we pull together fifty-five FM stations and a couple or three television stations when somebody like the Secretary of Agriculture addresses some group on our campus. Every day of our lives our station, WOSU-TV, is connected to two commercial stations to take our children's programs and other programs. Is this a network or is this a cooperative pro tem linkage?

Now, I was asked to speak in broad terms about the organization and administration of state television networks, interstate networks, and possible corporate structures. Who can agree on what forms of organization there are, or how powerful a network vis-a-vis the stations can be?

If we start to look at structures, we see the Alabama Educational Television Commission . . .

which is the licensee of three, and ultimately more, stations. It owns those stations, and that is a corporate unit established by the state.

In Oklahoma they have a state authority which holds the licenses for two stations, again with a group appointed by the governor and confirmed by the legislature.

In Florida you have a state-created educational television commission which is a linkage proposition. It does not own the station licenses, but it serves to connect them. This is its essential purpose.

Here we get into the heart of the problem in some respects, and I will go back to my home ground if you will pardon me. In Ohio, the educational television network development began first in the state department of education and the state board of education, (which is an elected group, amounting to a board of directors, one from each congressional district, and which supervises the superintendent and the state department). They thought in terms of either direct instruction or supplementary instruction for the secondary and elementary schools.

On the other hand, the Governor's Commission on Education Beyond the High School is thinking of a network in terms of junior colleges and sharing university resources. This had shreds of the Southern Regional Education Board network thinking in it—sharing resources from campus to campus on a non-broadcast, but also on a broadcast basis, for students in and out of classrooms on the junior college level.

Now, to the stations in Ohio. Those on the air are owned by a community group—a community station. But Cincinnati is an atypical one because it consists of fifty-three school boards in three states; the membership constituency includes parts of Indiana, Ohio, and Kentucky.

In Toledo, there is another community station where the dominant aspect is the public school, again to some extent a private university; in Columbus, a state university; and in Miami, another state university, whose announced plans before the fact were to use this for specific extension education. The stations which will emerge will be a composite of university and community—in one case a whole regional community development, the Miami Valley.

Now, it was inconceivable to anybody there that any state authority could institute a curriculum which would make any school person sit still or any university president sit still.

. . . Some of the innocents in the planning said, "We have got to have two networks"—that is, two complete microwave relay circuits. One would be public schools, and one would be university.

Well, you see, if you had one facility, depending on the number of hours, it could be like the FM baseball network—something at X hour and something else at another hour.

But the total corporate structure of Alabama or Oklahoma simply won't work in Ohio. It's this kind of problem into which you find yourselves entering. So I think it's most important to decide what you want to use it for.

Now, why has there been this interest in networking? Actually, it springs from economic need, I think. The early history of educational radio meant limited facilities, limited resources. That concert which was going on in New York or Boston or Los Angeles could not be obtained except by tape or some kind of wire linkage in Illinois or Iowa. And so this was sharing resources.

Also, it is an economic fact that if there is a central program service from which stations can pick and choose, and if you believe that a station should be on the air as long as possible—this is for free adult broadcasting—this helps sustain your program.

. . . If we can get into the instructional side for a moment—contrary to the ground rules which have governed the formation of commercial networks, whose key centers have been at one time Chicago, before there was a fall-off, then Los Angeles and New York, which was an economic expression. Where they had more talent and more resources in these cities, they governed their expansion by what would pay off. And since they were after big audiences, obviously the biggest flowering was in the population centers.

This has tended to be the case also in educational television, and this really represented more economic resource in a given cluster of institutions in a given city. But our need may be for networking in the South Dakotas and the Arizonas, where educational privilege is limited, or in Nebraska, as Jack McBride has started to pursue.

So we have a different economic formula to think of in this respect.

Throughout this conference, on the sidelines, I have heard this image again. We have a fixation in this country, it seems to me, of fear of what we call federal control. It's any kind of unitary control. And, obviously, things like the Post Office, American Telephone and Telegraph, and networks have to have some kind of trafficking system. Ten men can own an airplane in a club, but one man has to govern how it's scheduled, even if you elect him month by month.

I would see most of these structures probably developing within states because of the curiosities of educational organization within states. Then there come to be linkages.

. . . Franklin Bouwsma and I have talked a great deal about linking Ohio and Michigan, and from there it goes other places. As we see it now, we haven't even raised the question of administrative or corporate structure. Probably we'd start in on sharing the program need. We would get into a traffic problem ultimately. But presumably you do need a one-, two-, or three-state structure.

I will go back again to the baseball network for one hour, and a total program service like NBC. It might be that Bouwsma and Hull—with the two stations they represent [WTVS and WOSU] and the cluster of stations that go with each—would like a certain kind of classical music or editorial or analytic comment of the kind that comes in Harper's or Saturday Review at night in a news program, and if there were enough of those things we might have to agree what would happen week by week and year by year. We might also have to do the same thing if there were a given educational program or lesson or series of lessons which we wanted to co-produce with the facilities of three states.

Now, if we came to the point of a corporate structure, there are many models around the country already. The SREB is one. The various councils that have formed under the aegis of the Ford Foundation for educational television are examples.

There is in southwestern Indiana, for instance, an organization which incorporates forty-seven school districts which work cooperatively to achieve essentially these objectives.

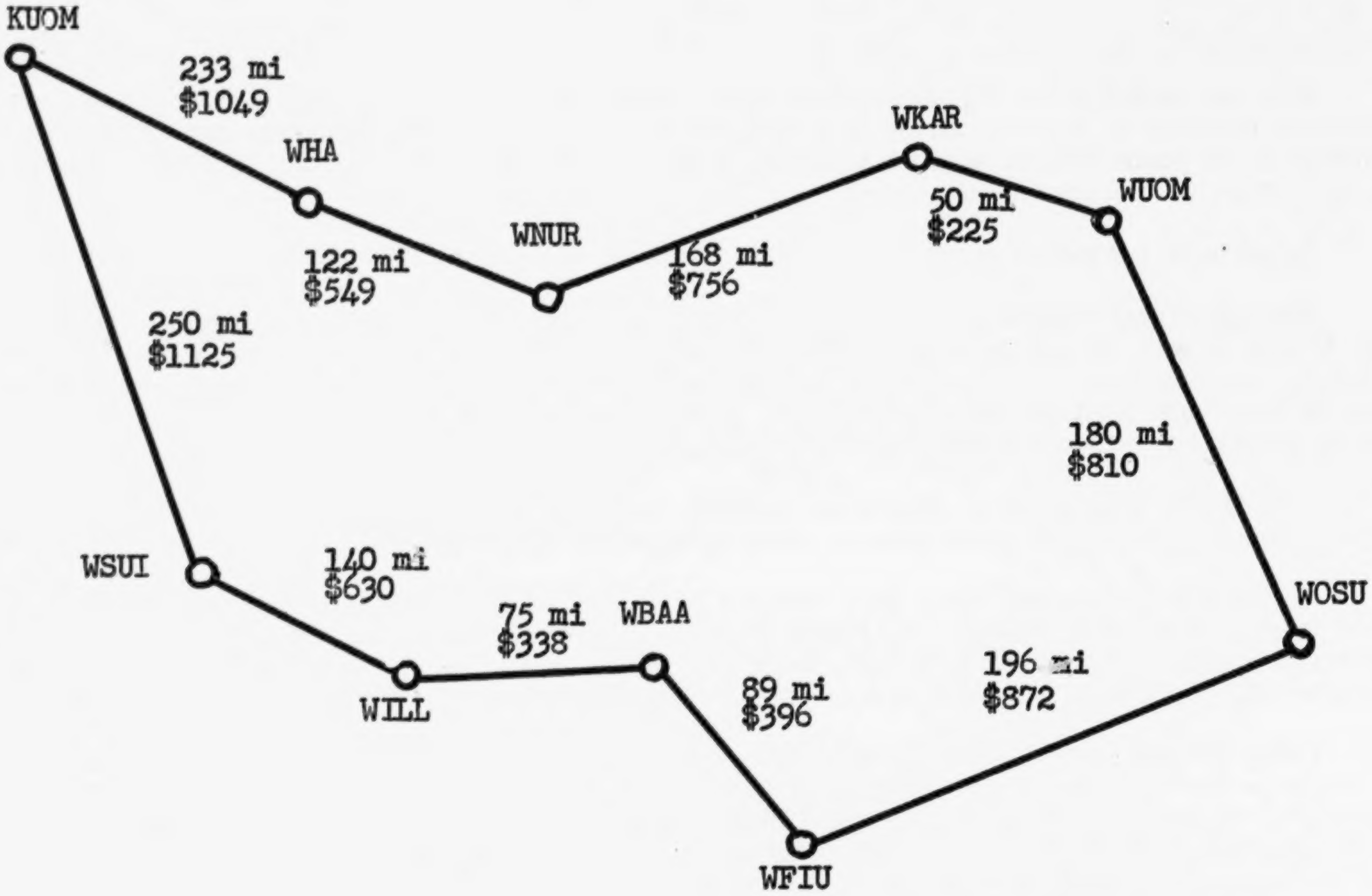
I would like to point out two more things.

Assume that you have a network which makes it possible to connect forty-eight states or ten states. How could you use that in terms of the older tradition of radio and television stations broadcasting to free-choice adult audiences? Out-of-school children would have one kind of service requirement. On either the secondary or elementary or the higher education level, formal instruction would take another form. And this is another use of the same collection of dishes and towers, and you might have a separate corporate structure for that. We don't have to assume single ownership for these things.

A third use might be what industry has already been engaged in for eight or nine years, the kind of thing duPont does or General Electric or the doctors when they have closed-circuit hookups over the country. Education might find repeated uses for that sort of thing, and it might want a nationwide network, and this is not any kind of superimposition of anything on anybody. That could be occasional.

The complication comes, I think, because to a great extent we're publicly financed and we find ourselves thinking in terms of familiar patterns to which, to some extent, we have to conform any time we conform to a legislative or social structure in our states.

Don't forget that any network that I know of has the phrase "option time." This is a double-barreled option. In terms of traffic convenience a network may have to have option-time schedule prerogatives. But the station always has the right of refusal, and there is no way of avoiding control more quickly than by turning a switch.



Big Ten Round Robin Net
Monthly line charges indicated

Figure 14

Following are some notes on the telephone circuits and operation for the proposed Big Ten and University of Chicago radio network.

The AT&T Long Lines Department reports that the costs outlined in Figure 14 are as accurate as can be determined at this stage and in all probability are within plus or minus 5 per cent. Operational costs are based on network use eight hours per day (any eight consecutive hours) seven days per week.

The plan is based on a round-robin operation—or with transmission around the complete loop in one direction.

Schedule A facilities (100-5000 cps) are proposed. This is the highest quality available for such network operation and is the same as that used by commercial networks.

The complete network will be set up by the telephone company and will be maintained by them. It will require no switching on their part. The only switching operations will be by the individual station as it goes to a "transmit" mode and then as it returns to a "receive" mode.

The telephone company reports that if the network is rented as we propose, it is ours to use in any way we see fit. In other words, any part of the time we desire may be used for closed-circuit communications other than broadcasting—for example, to make daily program corrections, to conduct network business, or use by other university departments or by administration for closed-circuit communication. The telephone company suggested that for such purposes they would install a special telephone set with a push-to-talk switch.

ESTIMATED MONTHLY LINE CHARGES

BIG TEN RADIO NETWORK

Interexchange Channels	$6,750.00
Local Channels - Receive (10)	50.00
Transmit (10)	50.00
Station Connections - Receive (10)	550.00
Transmit (10)	550.00
Total Monthly charges	$7,950.00

The above is based on ten points for transmission and reception. It assumes the use of one point by both the University of Chicago and Northwestern University.

If it is desired to install separate transmission and reception points for Chicago and Northwestern the added cost per month will be approximately:

Interexchange channel 24 mi.	$108.00
Local channels receive	5.00
transmit	5.00
Station connections receive	55.00
transmit	55.00
Total per month approximately	$228.00

Figure 15

DISCUSSION

FRYMIRE: What do you want in the way of a network? Is it to be a mutal network? How large a central production organization do you want to produce programs for the network, if it is not to be almost exclusively a mutual network? How large a staff will this take? How expensive will this staff be? For the administration of this network, where do you think it should be located? Shall we own our property or shall we rent it? Should it necessarily be on a university campus, even if it is in a large metropolitan center? Should it be in a school system plant that may now be under construction somewhere? Think about network headquarters for a moment. Do we have to have, because it is a live network, a bank of duplicators or recorders of some kind? Do we have to have extensive test equipment? How extensive will be the engineering services provided by this network? As to the personnel of this network, will it be made up of a manager, an assistant manager, X number of producers, a chief engineer and several assistant engineers, and an office staff? Or are you going to pay for only a couple of people? What would the salary schedule be for this staff that you envisage for the network? If you have a large staff in a large metropolitan area, I presume you'll have a different set of figures for which you'll have to be responsible. As to the operations budget of the network, should it cover an organizational structure such as the Center has—with roving contact people, station relations people, etc.? Or are we going to conduct our business on a closed-circuit audio operation via our network line? Your thoughts and decisions can be as variable as there are people in this room, and it's our job, within the next couple of days to narrow our thinking so we can decide what it is we can do and what it is we want to do. And I believe that this is the crux of the matter, as far as money is concerned.

Your thinking can range among the following:

1. Menzer's proposal for fifty-two midwestern stations—at a cost of approximately $17,500 per month.

2. Gunn's eastern regional network—at a cost of about $6,000 money actually laid out for beginning operations and development, but for which the monthly expense is negligible.

3. The proposal for the Big Ten and Chicago—at a cost of $8,000 per month ($228 additional if we add an eleventh station in Chicago) for actual operating costs.

4. The Wisconsin network- costing $425,000 a year now.

5. The Michigan network (and we use a small "n") of four interconnected FM university stations—at no cost whatsoever.

6. A regional network or several regional networks.

We've already had a lot of groundwork laid in thinking, but we have not refined our thinking, and this is our purpose here at the seminar. So what do you want?

In my "working paper" I asked you to consider some possibilities about financing. I presume everybody in his thinking at this stage assumes that some foundation is going to have to provide funds for the network. Well, is this necessarily true? Does it have to have foundation support?

Discussion Group B figures that it's going to cost $500,000 a year at least to run this network. Well, is this so? Are there other possibilities for financial support that we should explore? What about the commercial industry today? Will they, through the generosity of their good hearts, offer us actual help in setting up a competing radio network? Some people believe they will, that certain broadcasters will be of material and significant help in providing funds and equipment to set this network in operation. Is there one single, private philanthropist, to whom we can go? Is it important that we confine our thinking to one type of network—live, line—or is it possible to combine several types of network arrangements that will change and completely alter the financial picture of this thing?

At this time, I'd like to have Mr. Jansky explore with us a few ideas about some of these possibilities that I believe will open up some areas of financial responsibility that perhaps we haven't really considered as yet. After Mr. Jansky is finished perhaps then we can get some cross talk that will provide some of the answers to some of these questions. Obviously, there are several channels of dominant thought running through this seminar. Some people think it's going to cost tremendous sums of money. Others think it can be done relatively economically as far as individual participation cost is concerned. Let us see if we can intensively explore this and come up with some positive answers. I doubt that anyone is prepared to submit at this point a "model" financial structure for a network.

JANSKY: My thinking on this is, embryonic, but after our sessions at this seminar, I look upon this as a "systems" problem—a systems problem involving technical considerations. A systems problem is one in which you try to define your requirements and then on the basis of the state of the art—in this case, the art of interconnection—you try to develop specifications for a system. You may come up with a system which is tentative; then you return to your requirements people for their approval.

There are three phases to this broad problem:

1. The program phase. What programs do you want to broadcast on a network?

2. The technical phase. What are the methods of interconnection, their capabilities and limitations, and their adaptabilities to the problem at hand?

3. The financial phase. What is it going to cost?

This morning I tried to put down some parameters in this thing:

1. The ultimate objective is complete coverage of the United States and part of Canada with a network, plus the possibility of breaking this network down into regional networks.

2. The first approach today to the ultimate objective should be the establishment of regional networks. At first I have noted three—eastern, midwestern, and Pacific. There may be others, as for instance southeastern.

3. In each region a specific group of stations should be selected as a nucleus for that region.

4. Some of these stations will be AM and some will be FM.

5. Some will be full-time and some will be part-time stations.

6. Maps should be prepared showing the defined daytime and nighttime coverage areas for each station. These may be based upon measurements already made, or they may be estimated from calculations.

7. Generally speaking, the fidelity characteristics of a unit AM system are such that there is no need to provide for the transmission of frequencies above 5000 cycles in such a system. There are exceptions. The principle bottleneck in an AM system is the characteristics of the transmission medium. Where the population receives high enough signal strengths, it can receive pretty high fidelity from an AM station.

8. Generally speaking, it is possible to broadcast and receive higher fidelity programs over FM than over AM.

9. The fidelity requirements it will be necessary to meet with a network will depend upon the type of programs it is desired to handle over a live network. High-fidelity music will require a network much higher in fidelity than will speech. Therefore it would be helpful to have a decision as to what types of programs are to be handled on a network. This decision may be different for different regions. A determination by network people of what type of programs they want to broadcast is going to determine, in some respects, what the network may cost, particularly where it includes AM lines. There might be different decisions for different regions.

10. Except over a live network including only FM stations, it is not practical to handle high-fidelity music programs.

11. Except over an FM network, high-fidelity music may best be handled by the tape network.

12. There are several methods by which stations can be interconnected:

a. Direct interconnection of FM stations as is done in Wisconsin.
b. Direct interconnection of FM stations with multiplexing. (When standardized and developed properly, multiplexing would enable the broadcasting of a local program on one channel and relaying the network program on another channel.)
c. Microwave relay.
d. VHF relay.
e. Wire.
f. Possible others.

I think this group has a wonderful opportunity to study the characteristics of different systems. You can find the best answers from a study of what you now have, both from the standpoint of what you can do technically and what it's going to cost.

13. The fidelity and technical characteristics of each of these systems is different.

14. The cost of these systems varies with the specific application. In some instances, one may be more economic than the others; in other instances, a different system may cost less.

15. A complete regional system may use several or all of these systems, depending upon the requirements for each specific link.

Once there has been a decision as to the types of programs a network is to handle, the problem of determining how stations shall be interconnected is technical and economic.

BURROWS: If we have within one region a round-robin system with some stations connected by direct off-the-air pickup and other stations connected by telephone lines, is it possible for the telephone company to provide service for these limited network sections rather than for the whole network?

RUSSLER: Yes, if the network that you are providing is entirely made up of FM stations.

BURROWS: Not AM?

RUSSLER: Not under our present rules.

DREYFUS: One of the economic questions hinges on legal restrictions as to the use of lines. We discussed the nonbroadcast uses of such a round-robin network. Could we, for example, serve an institute or organization such as the PTA or UAW by letting them use, on a closed-circuit basis, our round-robin network, for which they in return would help pay the cost?

RUSSLER: In general if these organizations serve a community or educational purpose, the answer is Yes; you can do anything you want to do.

UPHAM: Is there any chance that we might get some space for a broadcast relay on VHF?

JANSKY: I don't think it's impossible, and I base this on the fact that we recently engineered an interconnection system for an agency which has a number of base stations—and they are interconnected by straight VHF relay operating on some frequency on the order of 400 mc. I have not made any assumptions with respect to what might be called regulatory limitations. Nor have I assumed any regulatory or company tariff limitations with respect to what you can do. This is because limitations change as needs change.

CLAYTON: Can you use a multiplex system with microwave relays? Are the two compatible?

PETERSON: Yes, it is entirely possible. In fact TV sound is transmitted on studio-to-transmitter links by a system of multiplexing.

LEWIS: Now they're putting two audio circuits on microwave relay. Of course one is not of ideal quality. This may change, but so far we don't recommend the extra channel except for low-grade communication service.

HARRISON: If you multiplex on FM, can your side channels carry a fairly full frequency without high-fidelity circuits?

PETERSON: We are anticipating on the New England portion of the network that, as soon as the regulatory limitations now imposed on us are overcome, we will be able to achieve a transmission channel of 15 kc. Actually we plan two transmission channels. One is a low-quality control channel for control of the network and the second is this 15 kc program channel which is anticipated to be on the same order of quality as the main channel. The ability to multiplex these two channels successfully depends on the state of the art and the quality of manufacture of receiving equipment. It is not a limitation of the transmission function.

KIRKPATRICK: How does the degradation of the subchannel signal in multiplexing compare with that of the main channel? Is it more severe?

PETERSON: As you go out in distance from the transmitter, the subchannel signal generally falls off sooner than the main channel.

DREYFUS: We know what the technical capabilities and limitations of Carl Menzer's plan will be. We know what the cost will be. In terms of the FM multiplex system we don't know what technical limitations there will be, but Hartford Gunn will have some of this information in about six months. We now might figure out where we have to drop in FM relays to duplicate what Carl has set up by line. And the third possibility is putting in some lines on Carl's figures for off-the-air pickup from multiplexing systems.

MENZER: I might add that in the Midwest we have been studying the possibilities of FM connections similar to those that Hartford Gunn has suggested and there have been some measurements made although they're pretty sketchy. It appears that a good deal of expensive construction might be necessary.

HARRISON: Has anything been done on the intermixing idea? I mean part relay and part line.

MENZER: Not in the Midwest.

NELSON: How about some of the shorter hops, say between WOI and WSUI? and in Illinois and Indiana? Wouldn't these be possible?

MENZER: It's actually about 110 miles between Ames and Iowa City. WOI and KSUI both have about 15,000 watts in power, but we have never been able to obtain satisfactory signals for relay purposes.

NELSON: How about WILL and WBAA? They don't look too far away.

MENZER: Illinois has 300 kw but does not provide a sufficiently strong signal in Iowa City. I don't know about transmission between Illinois and Purdue, because Purdue doesn't have its FM station as yet.

DREYFUS: The states of Wisconsin and Michigan are capable of linking air-to-air right now. It would appear that in Indiana it would be almost possible, Ohio looks to have two possible sections, and there might be possible subregional links. If those are laid out we might figure what lines are needed to go between them.

EBLEN: Research we had about ten years ago on air relay between our station at Delafield and Chicago—which is about 100 miles—showed that we encountered no problems. And I'm sure that we can link Wisconsin, Michigan, and Minnesota as soon as the University of Michigan gets its transmitter in the western part of the state.

FREDETTE: One other thought we must keep in mind is that line costs continue on and on, whereas you could in many instances buy a chain of microwave relays and have them paid for relatively easily.

EBLEN: We are using one in northern Wisconsin right now which cost us around $12,000.

MENZER: Another important point which hasn't been brought out is that there are continuing maintenance costs on those microwave installations. A summary of such costs, at least estimated for a radio and TV system, is available in John Schwarzwalder's report of his six-state study. The maintenance costs for such a radio-TV system are quite substantial, and can't be neglected.

group reports

GROUP A

Hartford Gunn, Chairman, WGBH, Boston.

Don Angell, WXPN, Philadelphia; John Clayton, WUNC, Chapel Hill, N.C.; Charles Ellis, WGBH, Boston; Albert Fredette, WAMC, Albany, N.Y.; Ruane Hill, WAER, Syracuse, N.Y.; Robert Kirkpatrick, KRFK, Richmond, Va.; Fred McWilliams, WDUQ, Pittsburgh; Harold Nelson, WDFM, State College, Pa.; Roger Peterson, Jansky & Bailey, Washington, D.C.; Jack Summerfield, The Riverside Church, New York City; Don Upham, WGBH, Boston.

The Use of Commercial FM Radio Stations as Intermediate Links in an Air-to-Air Network

1. Harold Nelson reported that his station (WDFM, Pennsylvania State University) has been utilizing a commercial station in Pottsville, Pennsylvania, to bring in programs originating at WNYC, New York City.
2. It may become more and more difficult to obtain permission to use FM commercial stations' main channels—as FM stations in many areas are earning substantial profits from programing, leaving little time for educational programs. Multiplexing may be a way of using a commercial station for educational relay without interrupting the income-producing commercial programing on the main channel.
3. An educational station using commercial facilities would be wise to write an agreement with the owner at the start, covering time clearances, station ID's, switching sequences, and technical standards.
4. The linking commercial station(s) might be sold or have a management change; this would break the network contact and should be anticipated if possible. The group agreed that the use of a commercial station should be recognized as a temporary expedient.
5. Commercial FM stations may help such network arrangements because of their interest in performing a valuable public service. The commercial station should be given credit for providing network facilities.
6. If the material is transmitted via a commercial station, problems may develop on clearances for program material cleared for broadcast for educational noncommercial use.

Civil Defense Funds for Networks

Matching funds for certain equipment from civil defense authorities were discussed. Stand-by transmitters, electric power generators, etc., might be provided. This possibility should be investigated.

Hours of Network Operation

1. The group felt that the evening hours—"prime time"—were of greater importance to the eastern network than daytime hours.
2. It is possible that daytime programing should begin as soon as feasible.

The Future Role of Tape Networking

1. Tape recordings could bridge gaps between regional "live" networks.
2. The present NAEB tape network should be retained as long as a use remains for it.

Type of Network Organization(s)

1. We should form regional networks of stations actually running.
2. Later, we should incorporate these regional networks so that grants may be received. Grants would be used for the purchase of equipment for the member stations and to improve the program service.
3. We should create a national network center to coordinate regional networks. Suggestions for location (in order of preference): Washington, D.C., and Chicago, Illinois.

One-Month Trial of Eastern Network

The possibility of a one-month trial of the eastern network was suggested. A combination of air-to-air relay and telephone lines would be used. AT&T representatives estimated that a Class A wire line from New York City to Richmond, Virginia, in use eight hours a day, would cost approximately $1500 for the one-month period. This project would serve as an imposing demonstration of the value of network operation.

Pennsylvania and Upstate New York Links Between Midwestern and Eastern Networks

The group split into subgroups to plan air-to-air relays between existing stations of the eastern network and existing educational FM stations in the Midwest. Two possible approaches were discussed: one stretching from Erie, Pennsylvania, to Albany, New York; the other from Pittsburgh to New York City.

Erie - Albany

Erie, Pa. (new station required) to Buffalo, N.Y. (WBFU)	-	90 miles
Buffalo, N.Y., to Rochester, N.Y. (new station required)	-	70 miles
Rochester, N.Y., to Syracuse, N.Y. (WAER)	-	75 miles
Syracuse, N.Y., to Utica, N.Y. (new station required)	-	45 miles
Utica, N.Y., to Mt. Greylock (Albany, N.Y. - WAMC)	-	115 miles

Pittsburgh - New York City

Pittsburgh, Pa. (WDUQ) to State College, Pa. (WDFM)	-	115 miles
State College, Pa., to Pottsville, Pa. (commercial)	-	85 miles
Pottsville, Pa., to Hackettstown, N.J. (WNTI)	-	75 miles
Hackettstown, N.J., to New York City (WNYC-FM)	-	50 miles

RECOMMENDATIONS

1. Funds should be found immediately to underwrite a full study of regional and ultimately a national live interconnected radio network. The study should be directed to all alternate methods of transmission, with technical and financial comparisons. This study will be essential for a speedy and efficient practical solution to live networking.

2. The proposed live network committee should review all legal (i.e., FCC) and tariff (i.e., AT&T) restrictions and regulations which may impede the rapid development of the live network. For example, at present no AM-FM station could broadcast on its AM transmitter network programs that were relayed by both wire and off-air relay. Thus, some midwestern stations would not be allowed to use programs originating with the eastern network, if line linkage is used by the midwestern regional network. C. M. Jansky, Jr., has indicated that these regulations can be changed, provided a valid case is made.

3. The proposed network committee should instigate a thorough study of multiplex receivers for long-distance, high-quality multiplex relay. The required standards and specifications should be determined quickly for use in this study. A new design may be warranted.

4. Each region represented on the live network committee should work toward establishing regional networks. News of the development of each regional network should be coordinated and distributed by that region's committeeman or his delegated assistant. The committeemen should also coordinate information as to the development of the several regions and the development of the national network.

5. An air express tape service may be used to link the regional live networks, especially the Pacific region. This will allow the use of timely programs. For example, the westernmost station linked with the eastern network, and located near an air terminal having frequent flights to the Pacific region, would record network programs. They would be flown to the Pacific region for playback. Thus, a program heard in Boston at 8 p.m. EST could be recorded at 7 p.m. CST and flown to the Pacific by 8 p.m. PST and heard at 9 p.m. in San Francisco. In all likelihood, Pacific region stations would want to delay certain timely programs a few hours, even if they were directly connected with the eastern region.

6. We believe that we in the eastern region can deliver a network program to Erie, Pennsylvania, and/or Pittsburgh. Whichever location is served by the eastern regional network would be the western extreme of that region. The midwestern network would be expected to interconnect at that point.

7. Group A is starting a newsletter to inform its people of network developments. We recommend that the other regional groups do the same. We recommend that the NAEB Newsletter run digests of some of this information.

Further, we recommend that formal reports on progress of the regional networks be scheduled for presentation at the San Francisco convention.

8. Our primary recommendation is that the individual stations and regional groups make every effort with all possible speed to determine the feasibility of live air-to-air relay in conjunction with or in addition to other means of network interconnection. The following is a report on this interconnection system as applied to the midwestern area.

Off-Air or Air-to-Air FM Radio Relay for the Midwestern Network

The following plan for off-air station-to-station FM radio relay is offered as a substitute for or supplement to the proposed telephone line round-robin network. It has been prepared quickly and without benefit of needed engineering data. It would have to be checked carefully and tested thoroughly by competent professional engineers. It is offered here only to stimulate thinking on alternate and, hopefully, less expensive ways to establish the network. The system proposed has advantages and disadvantages compared to a wire line system. These would have to be weighed and considered should the off-air system be practical from the technical and economic standpoints. Some of these advantages and disadvantages are listed in this report. It is worth noting that the list of stations that might be connected off-air might be expanded to include South Dakota, Kansas, Oklahoma, Missouri, Kentucky, Tennessee, and possibly farther south and west.

Again a reminder: This report is for starting the thinking about this subject; it is not the final, carefully prepared engineering report which must be completed before any action is taken to implement these suggestions.

West to East:

- KUOM, Minneapolis, should be able to receive WHWC, Colfax, Wisconsin, and thus the Wisconsin state network. KUOM should build an FM station (e.g., 50 kw) which will link it with WHWC.
- WHA, Madison, and the Wisconsin state network may reach to WNIC in DeKalb, Illinois (10 w).
- WHAD, Delafield, Wisconsin (the eastern point of the Wisconsin net) should readily interconnect with WBEZ in Chicago. WBEZ can feed WGVE, Gary, Indiana; WEPS, Elgin, Illinois; WNUR, Evanston, Illinois; and WNIC.
- WBEZ may not be able to interconnect at this time with WMCR in Kalamazoo. However, an existing 250 w station, WETL in South Bend (owned by the city), should be able to receive both WBEZ and WMCR. If this is true, and if WETL is raised to a higher power, WBEZ will be linked with WMCR.

  An alternate route is from WHAD to WMCR or to the proposed Grand Rapids station.

  The proposed University of Chicago FM station might use superpower (50 to 100 kw) and height (using a TV tower or its equivalent) and provide a direct link to Michigan, southern Illinois, and Purdue.
- WMCR links with WKAR in East Lansing.
- WKAR links with WUOM, Ann Arbor, which could feed WFBE, Flint; WHPR, Highland Park; WOAK, Royal Oak—all in Michigan; and Ohio stations WTDS, Toledo, and WBGU, Bowling Green.
- WUOM and WDET, Detroit, are already linked. WDET should be able to feed WBOE, Cleveland, and WHPR, WOAK, and WTDS.
- Ohio plans to establish a complete state-wide microwave facility which would readily link with WDET or WUOM through Toledo (WTDS, 250 w). Should this microwave facility not develop, an air-to-air relay network may be possible.

  WTDS should increase power to make this fifty-mile link. WBGU could also effect this link with WDET by raising its power from the present 1.4 kw ERP.

  WOSU, Columbus, can feed Ohio stations WMUB, Oxford; WOUB, Athens; WSLN, Delaware; WYSO, Yellow Springs; and possibly WGBU at Bowling Green. Therefore, for Ohio service, WOSU—through Toledo's WTDS (with power increases)—must link with WDET.
- The Ohio network should also make provision for obtaining reception of the eastern region programs from Pittsburgh (or possibly from Erie).

North Central to South Central:

Purdue University's WBAA, Lafayette, should be able to receive WBEZ, Chicago (a link of 100 to 120 miles). If it cannot, one microwave hop should suffice to bring the off-air FM receiver near enough for reliable reception. WILL at the University of Illinois, Urbana, may also receive WBEZ. WBEZ may be able to receive WBAA and/or WILL. If such linkage is possible, the long distance between WFIU, Bloomington, Indiana, and WOSU, Columbus, Ohio, can be avoided, as WBAA can receive and feed WFIU. This system will entail a new high-power FM transmitter for WBAA, which is already applied for. Rapid installation is urged.

East to West:

- WMUB, Oxford (western unit of the proposed Ohio network), should increase its power to make the 100-mile jump to WFIU. This power increase at WMUB will also make possible a direct link between WMUB and WOSU.

  Thus, WOSU to WMUB to WFIU to WBAA to WILL linkage is possible on air-to-air relay by increasing WMUB's power and establishing a high-power FM unit at WBAA.

- WSUI, Iowa City, may be able to receive WILL. WSUI should increase its power to establish a reliable off-air link with both WILL and WOI, Ames, Iowa.

- WWKS, Macomb, Illinois, may also be able to receive WILL. If so, WWKS should increase its power to relay WILL to WSUI if WSUI cannot receive WILL reliably.

- WOI would serve KDPS, Des Moines, at present. WOI should increase its power to reach WSUI.

- WWKS (with the recommended power increase) may be able to serve KSLH, St. Louis, which can now relay to WSRV, Carbondale, Illinois. If WWKS is not able to serve KSLH (and therefore, WSRV) these stations may provide line connection with WWKS or they may use microwave or a high-frequency link in conjunction with off-air receivers.

The above plan does not provide the following items which are provided by the Menzer plan (Figure 6, page 28):

1. Immediate installation when funds are obtained.

2. Reliability of line connections.

3. Direct connection between KUOM and WOI.

4. Service to the following stations:

   WWHI - 10 watts
   WVSH - 10 watts
   WSKS - 10 watts
   KWLC – no FM (might be served by WSUI)

5. Guarantee of service to KSLH and WSRV.

6. Ability to transmit network programs if key transmitters are not operating or are carrying local programs. The latter case can be corrected by the use of multiplexing.

Activation of this report will require the following expenditures:

1. High-quality FM receivers at all stations.

2. Possibly complete multiplex facilities. Such facilities might be purchased only by "main line" stations.

3. New FM stations at KUOM, WBAA, and the University of Chicago.

4. Power increases for WETL, WOI, WSUI, WWKS, WMUB, WTDS, and possibly for WBEZ.
5. Installation of the Ohio state microwave network and/or equivalent off-air system.
6. Thorough engineering survey to determine exactly what steps should be taken and the costs involved.

Activation of this report will provide:

1. The round-robin main line.
2. Service to at least thirty-three and probably thirty-seven of the stations served by the Menzer plan shown in Figure 6.

The advantages of this proposal are:

1. Minimal operating costs.
2. 15 kw service.
3. No line costs.
4. Two additional circuits—one high-grade and one low-grade—through addition of multiplex facilities allowing special services such as data transmission, facsimile, teletype, and slow scan TV; closed-circuit seminars and conferences; remote control circuits; and station independence to broadcast a local-interest program while serving a network function (on the multiplex circuit).
5. Relatively easy expansion of network to include additional areas.
6. Stations also may be able to share the costs of interconnection with other agencies and media, as is proposed for the Ohio state network, or ride piggyback on a TV facility.

NOTES:

1. It should be noted that increases in ERP which are required by this proposal will provide better service to larger audiences in addition to serving as network links.

2. While this proposal advocates exclusive use of FM relay, portions of the network may be served by wire lines or by VHF or microwave links. Each link should be studied separately with consideration for all possible alternative linkage systems.

3. This entire proposal might be activated for a one-time cost of about $250,000, with an annual maintenance and operating cost of less than $20,000. The combined costs of the air-to-air relay network compare favorably with the annual cost of $211,020 of the Menzer plan. Again, these figures would have to be checked carefully by a professional engineering organization.

GROUP A

Suggested Programing

MAIN CHANNEL	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
EST 7 a.m.	News, weather, and small magazine segment					→
	Music - BFA					→
8	News, weather, and small magazine segment					→
	Music - BFA					→
9	Academic credit courses: each 15 or 30 or 60 minutes					→
10	Women's specials: Gardening, cooking, child care and development					→
11	Academic credit courses: each 15 or 30 or 60 minutes					→
12	Medical conferences	Agricultural and agribusiness	Medical conferences	Science	Education	
1 p.m.	Academic credit courses: each 15 or 30 or 60 minutes					→
2	Concert music and drama					→
3	↓					
4	Stock Exchange programs				→	
5	Academic courses					→
6	BBC and CBC and RTF short programs					→
	Louis Lyons news and commentary and background interviews					→
7	Guest lectures—short series, one-timers, etc.					→
8	Daily Capitol Hill report					→
	Daily United Nations report					→
9	Academic courses					→
	Cultural America					→
10	Special reports on subjects of general interest—presentation and possible round tables on international affairs, science, etc.					→
	Theology, past and present—not worship services, but serious thought and discussion					→
11	Half-hour talks ↓					→
12	Music history programs					→
1 a.m.	Teletype and facsimile and data processing*					

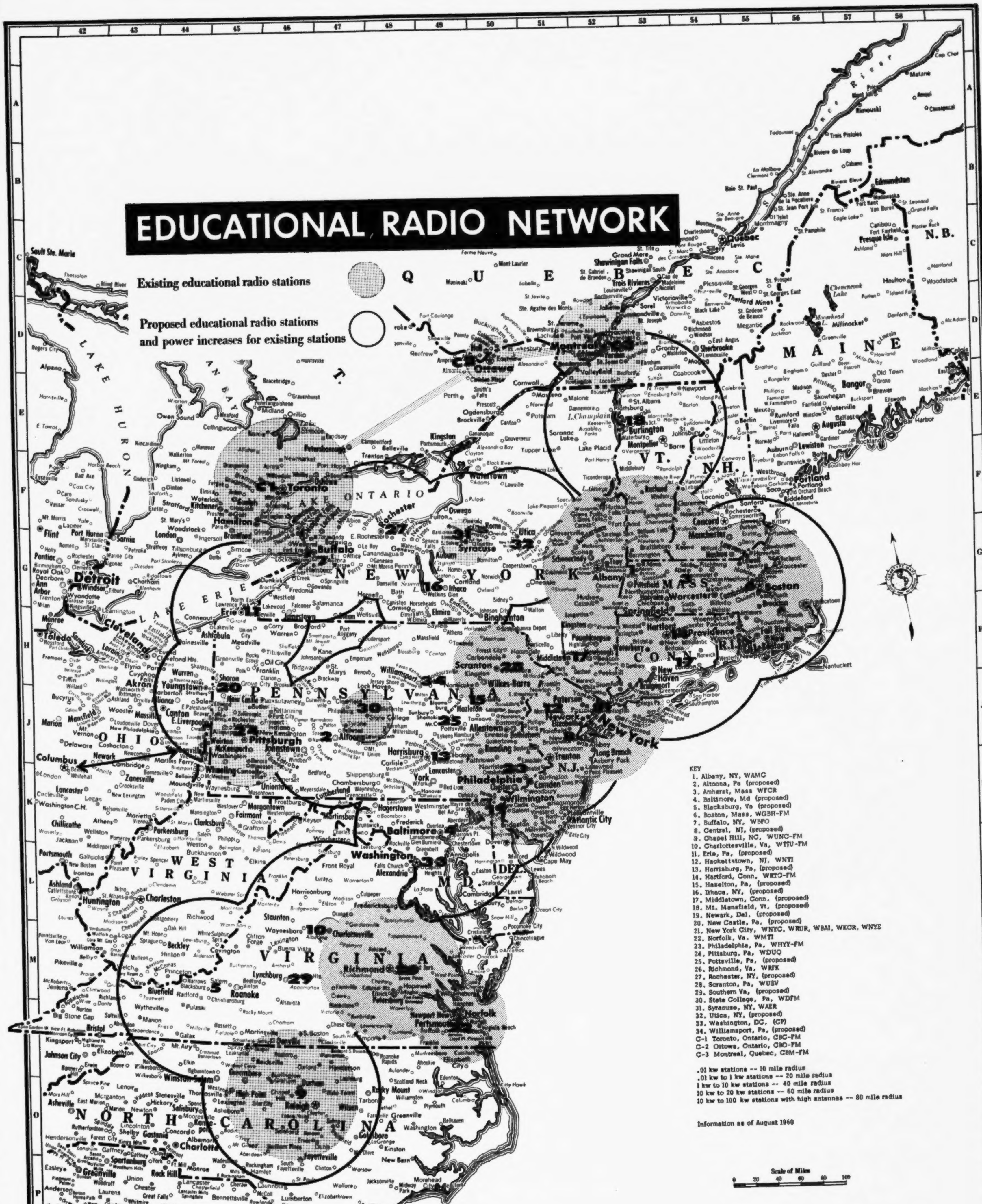
*These specialized services can be broadcast on both main channel and multiplex services. We expect the demand for this service to employ every available hour, especially when the participating institutions become more numerous—because both supply and demand for special facilities will expand geometrically.

GROUP A

Suggested Programing

MULTIPLEX EST	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9 a.m.	Closed circuit for network business, program audition, and selection.					→
10	Closed-circuit medical, asking for information for a current problem					→
11	Conferences for hire—Boston Conference on Distribution, IRE meetings, space environment symposium.					→
12	Educators' problems					→
1 p.m.	GE meetings					→
2	College students interrogate U.N. and government officials Private seminar					→ →
3	American Bar Assn.					→
4	Network business					→
5	Interinstitutional conferences: sports, president-to-president, department-to-department, special studies, etc.					→
6	Scientific groups—corporate and professional					→
7						
8	Flexibility for local programing—and to allow group and regional splits. This flexibility period could be divided into separate segments for morning, afternoon, and evening, if desired.					
9						
10						
11						
12 on to 9	Facsimile and teletype transmission—conference reports and documents, net continuity and business, interinstitutional information, scientific joint study information back and forth, computer and data transmission.					

EDUCATIONAL RADIO NETWORK


Existing educational radio stations
Proposed educational radio stations and power increases for existing stations
QUEBEC
N.B.
MAINE
VT.
N.H.
MASS.
R.I.
CONN.
NEW YORK
PENNSYLVANIA
N.J.
DEL.
MD.
OHIO
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
S.C.
LAKE ONTARIO
LAKE ERIE
LAKE HURON
Scale of Miles
0
20
40
60
80
100

KEY
1. Albany, NY, WAMC
2. Altoona, Pa (proposed)
3. Amherst, Mass WFCR
4. Baltimore, Md (proposed)
5. Blacksburg, Va (proposed)
6. Boston, Mass, WGBH-FM
7. Buffalo, NY, WBFO
8. Central, NJ, (proposed)
9. Chapel Hill, NC, WUNC-FM
10. Charlottesville, Va, WTJU-FM
11. Erie, Pa, (proposed)
12. Hackettstown, NJ, WNTI
13. Harrisburg, Pa, (proposed)
14. Hartford, Conn, WRTC-FM
15. Hazelton, Pa, (proposed)
16. Ithaca, NY, (proposed)
17. Middletown, Conn. (proposed)
18. Mt. Mansfield, Vt, (proposed)
19. Newark, Del. (proposed)
20. New Castle, Pa, (proposed)
21. New York City, WNYC, WRUR, WBAI, WKCR, WNYE
22. Norfolk, Va. WMTI
23. Philadelphia, Pa, WHYY-FM
24. Pittsburg, Pa, WDUQ
25. Pottsville, Pa, (proposed)
26. Richmond, Va, WRFK
27. Rochester, NY, (proposed)
28. Scranton, Pa, WUSV
29. Southern Va, (proposed)
30. State College, Pa, WDFM
31. Syracuse, NY, WAER
32. Utica, NY, (proposed)
33. Washington, DC, (CP)
34. Williamsport, Pa, (proposed)
C-1 Toronto, Ontario, CBC-FM
C-2 Ottowa, Ontario, CBO-FM
C-3 Montreal, Quebec, CBM-FM

.01 kw stations -- 10 mile radius
.01 kw to 1 kw stations -- 20 mile radius
1 kw to 10 kw stations -- 40 mile radius
10 kw to 20 kw stations -- 60 mile radius
10 kw to 100 kw stations with high antennas -- 80 mile radius

Information as of August 1960

GROUP B

Larry Frymire, Chairman, WKAR, East Lansing.

Haskell Boyter, WABE, Atlanta; E. G. Burrows, WUOM, Ann Arbor; Lee Dreyfus, WDET, Detroit; Richard Estell, WKAR, East Lansing; Harry Lamb, WTDS, Toledo; Donald Quayle, WOSU, Columbus; Ken Wright, WUOT, Knoxville.

General Statement

It is proposed by Group B that a live national radio network for educational broadcasters be established. We base this proposal upon the following advantages to the United States and her citizens:

1. The immediate availability of "timely" information which is not now available under existing program exchanges or tape networks.

2. The coordination of the intellectual resources of the nation.

3. The psychological and prestige values inherent in such a network which would accrue to the local member station.

4. The benefits of more rapid distribution of prerecorded program material of a vital nature.

Basic Assumptions

1. It is assumed that all available systems of the art of interconnection will be employed in the establishment and development of this national network.

2. Group B assumes that all legal and engineering problems or questions inherent in later portions of this report are based upon the knowledge of these matters at the present time by members of this group, with a full awareness that some aspects of the report may be altered in the future upon the advice of qualified legal and engineering consultants or authorities and the advancements made in federal regulations and technological development.

Network Functions

1. Nonbroadcast
    a. Exchange of information, data, and research among organizational and institutional special interest groups. Example: University administrators, teaching faculties, professional societies.

b. Network business. Example: Manager's conference, program audition, daily program information.

c. Special services for professional groups. Example: doctors, lawyers.

d. Public service and community organizations of a national or regional nature. Example: PTA, labor groups, management groups.

The nonbroadcast uses proposed above are based on the assumption that land-lines and FM multiplex facilities will be available.

We would hope that the special-interest organizations will be able to help finance the cost of the network by their use of nonbroadcast services at an established per-hour fee.

2. Broadcast
   - a. General considerations
     - (1) It was proposed that the network be operated six days per week, from 1 p.m.to 9 p.m., EST. It was felt that these hours would permit the largest number of stations possible to carry the network live. The design of the daily program schedule is such that it is felt desirable that at least one day be set aside for local programing which would also enable the station to preselect special network programs for rebroadcast.
     - (2) By a vote of 5 to 3, it was decided that the network should not carry live music broadcasts. This determination was based on the limitation of frequency response of Class A telephone lines. While this would apply to a national network, it would not necessarily be true in a regional network which operated on an "FM relay" principle.
   - b. Program Schedule
     - (1) See suggested schedule.
     - (2) Clarification of program types not readily ascertained by the schedule:

       In-School Programs...two 15-minute programs for the primary and intermediate grades.

       Cultural America...an historical program embracing the many and varied regions and areas of the nation.

       USOE & NEA...programs designed to offer lines of communication to reach the profession of education. These programs emanate directly from the offices of the organizations.

       Primary and Intermediate School Children...out-of-school programs for the primary and intermediate ages.

       Conservation and Natural Resources...news and information about the uses and problems of natural resources including specific problems of conservation and recreation.

       Pre-Taped "Vital Issues" Documentary...programs produced by tape subsidiary for national distribution.

       Foreign Press...commentary from foreign countries such as the already-existent "French Press Review," "Review of the British Weekly," etc.

       Intellectual Humor...not a specific program designed only for the display of humor, per se, but rather a program of lightness, deftness of touch, whimsy, wit and humor in a variety of formats, e.g. documentary, satire, etc.

       Magazine...a "Monitor"-type format utilizing contributions from member stations, the content of which is of basic educational value. One of the prime values of such a program would be its flexibility.

       Youth Guidance...counseling and guidance of youth...career information designed for both youth and adult (parent) audience.

GROUP B

Suggested Programing

EST	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1:00 p.m.	Closed Circuit Conference Call	→	→	→	→	→
	Non-Broadcast Functions	→	→	→	→	Magazine ↓
2:00-2:30	In-School Programs	→	→	→	→	
2:30-3:00	Cultural America	→	→	→	→	
3:00-4:00	Lecture (Classroom)	Lecture (Guest) →	→	→	→	
4:00-4:15	Business-Markets-Labor	→	→	→	→	Seminar - Conference ↓
4:15-4:30	Women's Program	→	→	→	→	
4:30-5:00	USOE and NEA	→	→	→	→	
5:00-5:15	Primary School Children	→	→	→	→	
5:15-5:30	Intermediate " "	→	→	→	→	
5:30-5:45	Washington Report	→	→	→	→	
5:45-6:00	U. N. Roundup	→	→	→	→	Weekly News Summary
6:00-6:15	News Commentary	→	→	→	→	
6:15-6:30	Conservation & NTEL Resources	→	→	→	→	Youth Guidance
6:30-7:00	Pre-Taped "Vital Issues" Documentary	→	→	→	→	
7:00-7:15	Foreign Press	→	→	→	→	
7:15-7:30	Intellectual Humor	→	→	→	→	Drama and Interpretive Readings
7:30-8:00	Current Events Roundtable	→	→	→	→	Literary Arts Critique
8:00	Seminar, Conference	→	→	→	→	Viewpoints (How Foreigners see US)
	(Lecture Series					

Type of Organization

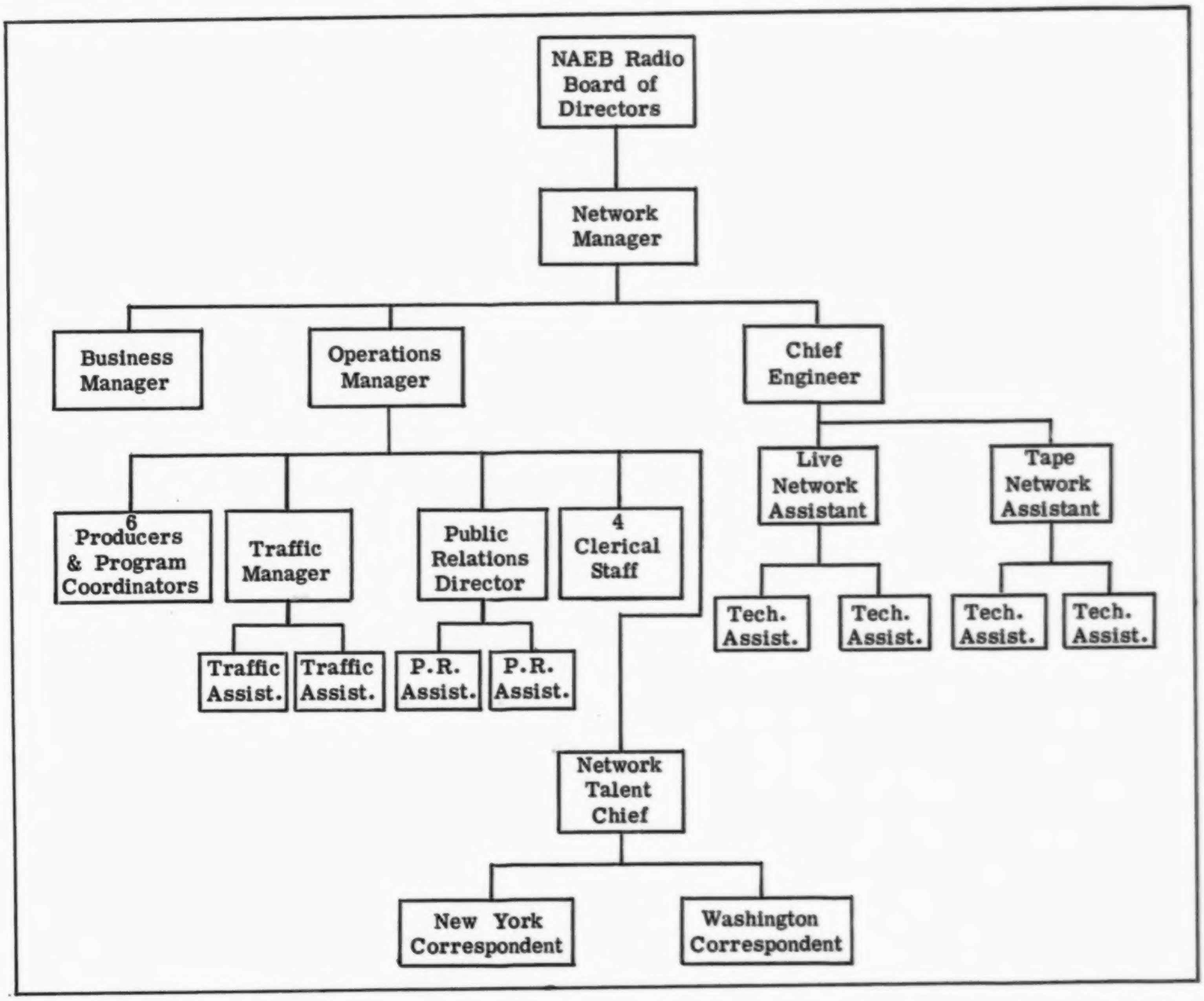
1. This network would be an integral part of the over-all NAEB functions.

2. It would be a separate division of NAEB responsible to the NAEB Radio Board of Directors.

3. By a 5-3 vote, it was decided that Chicago would be the most desirable location. Realizing the advantages and disadvantages of various locations, the following were major advantages for the decision:
   a. It was felt that since Chicago is a frequent meeting place for numerous national organizations, many resources would be available to the network.
   b. It is a more centralized location providing a more equitable availability for East and West.
   c. Based on the assumption that NAEB headquarters would be in Washington and the NETRC in New York, the selection of Chicago as the network headquarters would give us representation in a third major geographical area.

4. Staff Personnel

Based on the program schedule, in terms of requirements placed on member stations as well as the types of services expected by member stations from the network, this organizational chart was suggested:


NAEB Radio Board of Directors
Network Manager
Business Manager
Operations Manager
Chief Engineer
6 Producers & Program Coordinators
Traffic Manager
Public Relations Director
4 Clerical Staff
Live Network Assistant
Tape Network Assistant
Tech. Assist.
Tech. Assist.
Tech. Assist.
Tech. Assist.
Traffic Assist.
Traffic Assist.
P.R. Assist.
P.R. Assist.
Network Talent Chief
New York Correspondent
Washington Correspondent

Based on an average figure of $7500 per annum, a rough approximation of $210,000 would be needed for salaries alone. It was strongly felt by the members of Group B that a lower figure is highly unrealistic.

SUMMARY AND RECOMMENDATIONS

It was felt by this group that the basic proposal for the establishment of a live, national network for educational radio is entirely feasible. In order to accomplish this larger goal, the following recommendations are made:

1. Continued development of regional networks.

2. A provision for funds to conduct an engineering study which will determine the most feasible systems of interconnection which will be needed to accomplish the requirements of this network.

3. The creation of a live network committee being represented by members of the six NAEB regions, plus the chairmen of the radio network committee, the radio planning committee, the radio engineering committee, and the authority on eastern radio network operations.

GROUP C

Carl Menzer, Chairman, WSUI, KSUI, Iowa City.

John DeCamp, WBAA, Lafayette; Cliff Eblen, WHA, Madison; Harold Engel, WHA, Madison; Marguerite Fleming, KSLH, St. Louis; Clifton Holman, WSIU, Carbondale; Burton Paulu, KUOM, Minneapolis; O. Leonard Press, WBKY, Lexington; James Robertson, NETRC; Frank Schooley, WILL, Urbana.

Group C was directed by the seminar chairman to discuss and make recommendations about what should be carried on a live network and what should be carried on a tape network. Specifically, types of programs were to be listed. The relationships between the tape and the live network were to be examined.

Also the group was asked to report on certain parts of the Menzer report: the type of organization of a live network for educational radio, and the headquarters and staff for such a network.

CONCLUSIONS

1. The live network should be considered as the primary carrier of all programs. If proposed material lends itself best to tape distribution, so be it.

2. The network should operate for eight hours a day.

3. Program material is available for eight-hour operation.

4. The most suitable time for operation would be from 12 noon EST until 8 p.m. EST.

5. The organization of the network office should be as follows:
   a. Policy Board (Radio Board of NAEB)
   b. Executive Manager
      (1) Programing Manager) These would be supplied with advisory committees.
      (2) Technical Supervisor)
      (3) Traffic Manager)
      (4) Legal Manager) To be administered by Executive Manager.
      (5) Public Relations Representative)
      (6) Fund Raiser)
   c. Business Office

It was suggested that a total annual budget for the network headquarters should be in the neighborhood of $60,000.

GROUP C

Suggested Programing

EST	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
12:00-12:30	Instruction, Audition and Cue Time	→	→	→	→	→
12:30- 1:00	Guest	Guest	Guest	Guest	Guest	Youth Variety
1:00- 1:30	Lecture	Expert	Lecture	Expert	Lecture	↓
1:30- 1:45 1:45- 2:00	News Book Review	News Theatre Review	News Motion Picture Review	News Art Review	News Music Review	↓
2:00-2:30	Music (Institutional)	→	→	→	→	Grand Drama
2:30-2:45	In-School	→	→	→	→	↓
2:45-3:00	In-School	→	→	→	→	↓
3:00-3:50	Classroom Lecture	→	→	→	→	↓
3:50-4:00	Washington Reporter	→	→	→	→	↓
4:00-4:30	Panels and Discussions	→	→	→	→	Concert
4:30-5:00	Magazine Program	→	→	→	→	↓
5:00-5:15	Wall Street	→	→	→	→	↓
5:15-5:30	For Youth	→	→	→	→	↓
5:30-6:00	Children	→	→	→	→	↓
6:00-7:00	CBC BBC RDTF RIA	→	→	→	→	→
7:00-7:15	News Commentary UN Today	→	Presidential Press Conf.	News Commentary UN Today	→	Religious News Continental Commentary
7:30-8:00	Current Event Discussion	→	→	→	→	

6. The tape network headquarters should be located at NAEB headquarters on a national basis, but in the event of regional live networks, regionally located headquarters should be established.

RECOMMENDATIONS

1. This group recommends that the NAEB set as an ultimate goal the coverage of the United States by a national live network. As immediate steps toward this goal, NAEB should encourage the development of regional networks and the linking of individual stations. NAEB should also encourage the establishment of new, educational, radio stations and an increase in power for many of the low-powered stations.

2. This group also recommends a continuing study of the problems and possibilities of establishing and operating national and regional educational radio networks. The assembling and collating of information on a national basis will be the duty of the study group. Each and all of us should make continuing studies and provide the results to the national study agency.

GROUP D

Richard Vogl, Chairman, WOI, Ames, Iowa.

R. Edwin Browne, KFKU, Lawrence, Kan.; Jack Burke, KSAC, Manhattan, Kan.; Martin Busch, KUSD, Vermillion, S. Dak.; Ray Giese, WOI, Ames; Burt Harrison, KWSC, Pullman, Wash.; Ken Kager, KUOW, Seattle; Merle Kimball, KTOY, Tacoma; Glen Pool, WNAD, Norman, Okla.

In giving consideration to the establishment of a nationwide network, Group D, representing stations widely separated from each other, from the Mississippi River west to the Pacific, was almost automatically oriented in favor of viewing ultimate objectives, primarily as they relate to the problems arising from time differences, geographical distances from station to station, and large, sparsely populated areas of the West which nevertheless include scattered, rapidly expanding metropolitan concentrations not now served by educational radio.

This group feels that the ultimate goal should be a live network, covering forty-eight states, with a 12-hour to 18-hour daily schedule of programs. A further conclusion is that two essential related needs should be recognized as the network develops: One is the development of programs to serve stations already on the air; the other is for the development of programs which will encourage the building of new educational stations. These new stations, at the same time, will provide educational radio service to areas not now being served and will provide needed links in the western chain.

The first objective would call for a continuing program service. The second might require only a "starter package" on tape to help program the new station during its first months of operation. This "starter package" could, however, include programs also available to the main service, but at a reduced rate.

It will be seen that this concept envisions a total live service which at the beginning might amount to no more than an hour or two of nationwide service per day, while the "starter package" should include at least an 8-hour daily package.

It is felt by Group D that radio's second chance, which was thought to have occurred with the coming of FM broadcasting, is now actually here as FM booms nationwide. The NAEB has a major responsibility to encourage the development of new stations not only because of the service they can give to their communities, but also because of the need for these stations to fill the gaps in the national audience picture. Study might show the advisability of sending an NAEB task force into unserved communities where the gaps are most obvious, where populations are most highly concentrated, and where the opportunities for success in activating stations seems most promising. This task force would be armed with technical, economic, program, and educational know-how, plus the package of "starter service" programs.

Group D endorses the principle of "operational research" advocated by C. M. Jansky, Jr. It recommends the "ultimate plan" described above, but believes that such a plan must necessarily grow from a relatively modest beginning. This group further recommends that, as the present NAEB tape network gradually evolves into a national live network, care be taken to protect program service to those stations which are not able to be a part of the national live operation in its beginning stages.

Program Considerations

1. Time Schedule
    a. Stage 1 should be developed to provide ultimate daily service from 12 o'clock noon to 8 p.m.
    b. A further development should add morning service from 7 to noon, and nighttime service from 8 p.m. to midnight.
2. Content
    a. We believe that a live network would be advantageous primarily as a means for instantaneous coverage, and that therefore its greatest effectiveness lies in the presentation of programs whose value depends on speed of transmission. Most important are news oriented programs, including hard news, on-the-spot reporting, and news background, analysis and commentary. Specifically, we recommend:
        (1) At least two 15-minute daily reports from Washington, D.C., and from U. N. Headquarters, such as a morning preview and an evening summary.
        (2) Conference News Call, featuring a moderator in, say, Washington, calling in content specialists on various campuses. Half-hour daily.
        (3) Open forums on controversial issues, discussed with complete freedom.
        (4) Financial reports at the end of each day's trading on Wall Street and Chicago Grain & Produce exchanges, etc.
        (5) Brief news reports for insertion into local news programs.
    b. Outstanding musical events, productions featuring noted music personalities (for example, Bernstein, David Randolph) and unique and original compositions not available on commercial recordings. At least an hour per day for a classical concert, live or recorded, to help upgrade the quality of programing on small stations.
    c. Miscellaneous talk features, including classroom lectures by outstanding instructors, "Last Lecture" series by retiring professors summarizing their life's work, and key speeches from seminars and important national meetings. Serious drama, both "full length" and dramatization of short stories; commissioned radio plays by American writers, interviews with noted musicians, composers, authors, etc. Special features for youth, "golden agers," homemakers, rural listeners, and other specialized audiences.

Transmission

1. Regional Network Approach—The group recognizes the likely development of regional networks, which when interconnected would become the structure of a national net. Methods of transmission will vary according to local conditions. As indicated by Mr. Jansky, all methods should be investigated: wire line, tape, FM multiplex relay, microwave relay, and other possible means not yet developed. Five regions, based on geographical division, are suggested:

East Coast
Southeast
Midwest
Rocky Mountain
Pacific Coast

2. Tape Network Supplement—It may never be wise to drop the tape network completely because of economies, sound quality, and permanence. Also, as a supplement to the present tape network, we strongly advocate the development of a limited "express" network, to distribute news programs if of immediate interest via air express or air mail.

Staff

1. National Headquarters (Washington, D.C.)
    - a. National Network Manager
    - b. National Program Director
    - c. Washington Correspondent

2. Regional Headquarters (New York City, Atlanta, Chicago, Salt Lake City, San Francisco)
    - a. Regional Manager
    - b. Program Director
    - c. News and Public Affairs
    - d. Traffic
    - e. Technical

Live Network Implementation Committee

We recommend that a committee be named to pursue the rapid development of a national live educational radio network. The committee should include representatives of each of the six NAEB regions, plus others as deemed advisable by the president.

DISCUSSION

ESTELL: The Menzer report (Figure 6) assumes the proposed midwestern network to be connected by land line coordinating a round-robin basic network with one-way service to stations. Figure 6 lists monthly line charges from station to station. I'd like to present a new set of figures, taking into account the feasibility of using off-the-air or multiplex transmission where possible. Tabulating the monthly line charges from station to station as per Figure 6, we find a sum of $13,085 necessary. In an attempt to examine other methods of interconnection and resultant reduction of the above figure, the following is respectfully submitted:

Off-air interconnection between these points	Savings in line charges
WUOM-WDET, WTDS, WBGU	$ 455
WDET-WHPR-WOAK-WFBE (WOAK and WFBE pick up WUOM or WKAR)	325
WBOE-WKSU	144
WOSU-WSLN, WYSO	336
WFIU-WGRE, WIAN	337
WILL-WBAA	338
WOI-KDPS	135
KUOM-WCAL (Neither has FM)	162
WBEZ-WNUR, WGVE, WEPS (WNIC)	329
WBEZ-? (Grand Rapids proposed 10 kw FM transmitter power)	756
?-WKAR	(same)
WKAR-WMCR-WETL	522
WKAR-WUOM	225
	$4064
By deleting 10 w FM spurs, WWHI, WNIC (62 miles from WBEZ), WVXH, and WSKS until such time as finances or power increases allow joining the net, the following line charges are saved:	887
total per month	$4951

Clarification:

WDET can receive WUOM and thereby serve WHPR & WOAK.
WFBE can receive either WUOM or WKAR.
WTDS can receive WUOM and thereby serve WBGU.
WBOE, interconnected by land line to WDET, can serve WKSU off air.
WOSU can serve WYSO and WSLN off air.
WFIU can serve both WGRE and WIAN off air.

WBAA can pick up net from WILL off air.
WOI can serve KDPS.
KUOM can serve WCAL.
WNUR, WGVE, and WEPS can receive WBEZ off air.
WBEZ also can serve the proposed Grand Rapids FM, which in turn can serve WKAR, completing the off-air link from Wisconsin or Illinois to Michigan.
WKAR can serve WMCR, which in turn can serve WETL.
WKAR can serve WUOM.

The remaining stations not mentioned would continue to be served by land line as per Figure 6 until such time that increases in power or additional stations between long hops permit total interconnection by off-air multiplex.

GUNN: There are two disadvantages to the round-robin, off-the-air pickup, as compared to telephone lines:

1. Off-air pickup is dependent upon every transmitter in the network being on the air.

2. Off-air pickup is dependent upon every station agreeing to carry the network program.

Now, if we go to a multiplex system and assume that then we can bypass a station via the subchannel that wants to do local programing, we conceivably would solve one of the problems. However, we would still be dependent upon whether or not their transmitter is on the air.

EBLEN: I believe that air-to-air relay must presuppose the use of multiplex. I don't believe it is at all feasible without it.

BURROWS: It has been suggested that certain programs might be sent out on tape by air mail, special delivery. How do you justify this when you have a live network to do it?

VOGL: We are thinking of this as an interim step before we have a live network.

H. HILL: There is another possibility in this connection. If we can establish three or four of these regional networks, we could have reports prepared in Washington, or in New York at the U.N., as two examples, duplicated immediately on tape, and shipped by air to the key station in each of the four or five regional networks. It would be possible to get the tapes to these key stations within fifteen hours, say, after the program is produced. These stations would then each feed the program to the regional network it served. This would accomplish much the same purpose as the live network without an inordinate delay.

VOGL: Another consideration is that there are about 2500 miles between the Missouri River and the West Coast which is going to be one of our greatest problems. Even if the West Coast establishes a regional network, and we get the eastern and midwestern parts of the country hooked together, we may still have to use air-mailed tapes to actually link these two areas together—at least during an interim period.

SCHOOLEY: I think that the collection of data is needed and that it is not a responsibility alone of any one committee or study group, but the responsibility of each and all of us who are now broadcasting to aid in the building of the network or networks, national or regional. Many operational data are now available; many are not because they have not been tested. There are some theoretical operational data available for some areas. The way to really find out whether something will work is to test it and find out and then let someone know what the test results are. If we have a national study group, this is the place where these data should be collated.

MENZER: Roger Peterson and I have prepared a questionnaire to send to each of you which will start an engineering study. This will also give us information on the reception conditions that exist in the various areas as they might concern networking. So when you get these questionnaires, I wish you would have them answered in detail. For example, where it asks for your comments on receiving conditions as they might apply to network operations, don't just report that you received a certain station, but give us some details—such things as your receiving antenna, its installation, the receiver which is used, the type, the model number, its sensitivity if known, and so on. These questionnaires will be sent out from NAEB Headquarters to every station manager so he can advise his chief engineer of the importance and necessity of this information.

H. HILL: I would suggest, Carl, that since less than half of our station managers are represented here, you might prepare a brief covering letter, to go with the questionnaire, which would explain briefly that this Seminar felt that the accumulation of such information is essential to the success of a live network.

FREDETTE: It seems to me that it would be wise if the managers receiving this questionnaire would not rush to complete it, but would do a serious study over a week or two, or perhaps a month, of just what stations they can hear, using the best available equipment.

SCHOOLEY: I think it is important that the report show, as a consensus, that the group meeting here feels that a live radio network is and should be the goal.

H. HILL: It was the consensus not only that a live network should be the goal, but that we should aim at this nationally—and that as an intermediate step we should urge the promotion and starting of regional networks and possibly connect them when feasible...and subsidiary thereto, we should perhaps plan to send timely programs on tape by air to one station in each of the regional networks.

HARRISON: I think that the attitude of many of us when we came here—particularly those of us from the West—was that this idea of a national live network was pretty much a pipe dream. Now I think the most skeptical of us is kind of fired up over this. But, unfortunately, that applies only to those of us who are here. I think this must come up on the floor of the convention so we will have a real opportunity to transfer some of our enthusiasm to the others.

participants

Donald K. Angell, Jr., Director of Broadcast Operations, WXPN, University of Pennsylvania, Philadelphia, Pennsylvania.

Haskell Boyter, Director of Radio & Television Education, Atlanta Public Schools, Atlanta, Georgia.

R. Edwin Browne, Director of Radio, KFKU-KANU, University of Kansas, Lawrence, Kansas.

Jack M. Burke, Acting Head, Radio-TV, KSAC, Kansas State University, Manhattan, Kansas.

E. G. Burrows, Manager, WUOM, University of Michigan, Ann Arbor, Michigan.

Martin Busch, Station Manager, KUSD, State University of South Dakota, Vermillion, South Dakota.

John Clayton, Station WUNC, University of North Carolina, Chapel Hill, North Carolina.

John DeCamp, Assistant Director, WBAA, Purdue University, Lafayette, Indiana.

Lee S. Dreyfus, Assistant Director of Broadcasting, WDET, Wayne State University, Detroit, Michigan.

Clifford Eblen, Program Supervisor, WHA, University of Wisconsin, Madison, Wisconsin.

Charles Ellis, Assistant General Manager, Radio, WGBH, Cambridge, Massachusetts.

Harold Engel, Station WHA, University of Wisconsin, Madison, Wisconsin.

Richard Estell, Production and Facilities Manager, WKAR, Michigan State University, East Lansing, Michigan.

Miss Marguerite Fleming, Manager, KSLH, St. Louis Public Schools, St. Louis, Missouri.

Albert F. Fredette, Station Manager, WAMC, Albany Medical College of Union University, Albany, New York.

Larry Frymire, Manager, WKAR-AM-FM, Michigan State University, East Lansing, Michigan.

Raymond C. Giese, Operations Manager, WOI-AM-FM, Iowa State University, Ames, Iowa.

Hartford N. Gunn, Jr., General Manager, WGBH-FM-TV, Lowell Institute, Cooperative Broadcasting Council, Cambridge, Massachusetts.

William G. Harley, Chairman, NAEB Board, University of Wisconsin, Madison, Wisconsin.

Burt Harrison, Manager, KWSC, Washington State University, Pullman, Washington.

Harold E. Hill, Administrative Vice President, National Association of Educational Broadcasters, 14 Gregory Hall, Urbana, Illinois.

Ruane B. Hill, Faculty Station Manager, WAER, Syracuse University, Syracuse, New York.

Clifton Holman, Station Director, WSIU, Southern Illinois University, Carbondale, Illinois.

C. M. Jansky, Jr., Jansky & Bailey (consulting engineers), Washington 7, D.C.

Ken Kager, Operations Manager, KUOW, University of Washington, Seattle, Washington.

Merle Kimball, Program Manager, KTOY, Tacoma Public Schools, Tacoma, Washington.

Robert W. Kirkpatrick, Director, WRFK-FM, Union Theological Seminary in Virginia, Richmond, Virginia.

Harry D. Lamb, Director, Radio-TV Education, Toledo Public Schools, Toledo, Ohio.

Louie Lewis, Administrator, Educational Television Planning, Radio Corporation of America, Camden, New Jersey.

F. T. J. Madden, (representing Minnesota Mining & Manufacturing Company; in attendance part-time only), R. R. #1, Box 344, Germantown, Wisconsin.

Mrs. Betty McKenzie, Publications Editor, National Association of Educational Broadcasters, 14 Gregory Hall, Urbana, Illinois.

Fred McWilliams, Assistant Director and Chief Engineer, WDUQ, Duquesne University, Pittsburgh, Pennsylvania.

Carl H. Menzer, Director, WSUI, State University of Iowa, Iowa City, Iowa.

Harold Nelson, General Manager, WDFM, Pennsylvania State University, University Park, Pennsylvania.

E. L. Novak, American Telephone & Telegraph Company, 100 South 19th Street, Omaha, Nebraska.

Burton Paulu, Director, Radio & TV Broadcasting, KUOM, University of Minnesota, Minneapolis, Minnesota.

Roger Peterson, Jansky & Bailey (consulting engineers), Washington, D.C.

Glen Pool, Acting Program Director, WNAD, University of Oklahoma, Norman, Oklahoma.

O. Leonard Press, Director, Broadcasting Services, WBKY, University of Kentucky, Lexington, Kentucky.

Donald R. Quayle, Program Director, WOSU, Ohio State University, Columbus, Ohio.

James Robertson, Director, Station Relations, National Educational Television and Radio Center, New York, New York.

Frank E. Schooley, Manager, WILL, University of Illinois, Urbana, Illinois.

Jack Summerfield, The Riverside Church, 490 Riverside Drive, New York, New York.

Robert E. Underwood, Jr., Network Manager, National Association of Educational Broadcasters, 14 Gregory Hall, Urbana, Illinois.

Don Upham, WGBH (Project Director for the projected northeastern network), Cambridge, Massachusetts.

Richard F. Vogl, Manager, WOI, Iowa State University of Science & Technology, Ames, Iowa.

John F. White, President, National Educational Television & Radio Center, New York, New York (in attendance part-time only).

Kenneth D. Wright, Director, Broadcasting Services, University of Tennessee, Knoxville, Tennessee.

appendix

NAEB RADIO STATIONS
January 1960

ALABAMA (Region II)

WUOA	University	University of Alabama	3 KW	FM

CALIFORNIA (Region VI)

KPFA	Berkeley	Pacifica Foundation	10 KW	FM
KPFB	Berkeley	Pacifica Foundation	150 W	FM
KPFK	Los Angeles	Pacifica Foundation	75 KW	FM
KUSC	Los Angeles	University of Southern California	1 KW	FM
KVCR	San Bernardino	San Bernardino Valley College	770 W	FM
KSDS	San Diego	San Diego Junior College	250 W	FM
KCVN	Stockton	College of the Pacific	1 KW	FM

COLORADO (Region V)

KRCC	Colorado Springs	Colorado College	250 W	FM
KSHS	Colorado Springs	Colorado Springs Public Schools	250 W	FM

FLORIDA (Region II)

WTHS	Miami	Board of Public Instruction of Dade County	3 KW	FM
WFSU	Tallahassee	Florida State University	1 KW	FM
WTUN	Tampa	University of Tampa	1 KW	FM
WPRK	Winter Park	Rollins College	250 W	FM

GEORGIA (Region II)

WABE	Atlanta	Atlanta Board of Education	3 KW	FM

ILLINOIS (Region III)

WSIU	Carbondale	Southern Illinois University	3 KW	FM
WBEZ	Chicago	Chicago Board of Education	3 KW	FM
WNIC	DeKalb	Northern Illinois University	10 W	FM
WEPS	Elgin	Elgin Public Schools	10 W	FM
WNUR	Evanston	Northwestern University	10 W	FM
WWKS	Macomb	Western Illinois University	3 KW	FM
WMTH	Park Ridge	Maine Township High School	10 W	FM
WILL	Urbana	University of Illinois	5 KW	AM
WILL	Urbana	University of Illinois	50 KW	FM

INDIANA (Region III)

WFIU	Bloomington	Indiana University	10 KW	FM
WPSR	Evansville	Evansville School Corporation	3 KW	FM
WGVE	Gary	School City of Gary	10 W	FM
WGCS	Goshen	Goshen College Broadcasting Corporation	250 W	FM
WGRE	Greencastle	DePauw University	10 W	FM
WVSH	Huntington	School City of Huntington	10 W	FM
WIAN	Indianapolis	Indianapolis Public Schools	250 W	FM
WBAA	Lafayette	Purdue University	5 KW	AM
WWHI	Muncie	Wilson Junior High School	10 W	FM
WNAS	New Albany	New Albany City Schools	850 W	FM
WETL	South Bend	School City of South Bend	250 W	FM
WSKS	Wabash	School City of Wabash	10 W	FM

IOWA (Region IV)

WOI	Ames	Iowa State University	5 KW AM
WOI	Ames	Iowa State University	3 KW FM
KWLC	Decorah	Luther College	250 W AM
KDPS	Des Moines	Des Moines Public Schools	1 KW FM
WSUI	Iowa City	State University of Iowa	5 KW AM
KSUI	Iowa City	State University of Iowa	3 KW FM
KWAR	Waverly	Wartburg College	10 W FM

KANSAS (Region V)

KSTE	Emporia	Kansas State Teachers College	10 W FM
KFKU	Lawrence	University of Kansas	5 KW AM
KANU	Lawrence	University of Kansas	10 KW FM
KSAC	Manhattan	Kansas State University	5 KW AM
KSDB	Manhattan	Kansas State University	10 W FM
KTJO	Ottawa	Ottawa University	10 W FM
KMUW	Wichita	University of Wichita	10 W FM

KENTUCKY (Region II)

WBKY	Lexington	University of Kentucky	1 KW FM
WFPK	Louisville	Louisville Free Public Library	3 KW FM
WFPL	Louisville	Louisville Free Public Library	250 W FM

LOUISIANA (Region V)

WNPS	New Orleans	Orleans Parish School Board	250 W AM

MARYLAND (Region I)

WBJC	Baltimore	Baltimore Junior College	250 W FM

MASSACHUSETTS (Region I)

WAMF	Amherst	Amherst College Broadcasting System	10 W FM
WMUA	Amherst	University of Massachusetts	10 W FM
WBUR	Boston	Boston University	10 KW FM
WERS	Boston	Emerson College	18 KW FM
WGBH	Boston	Lowell Institute Cooperative Broadcasting Council	3 KW FM
WEDK	Springfield	School Committee of Springfield	10 W FM

MICHIGAN (Region III)

WUOM	Ann Arbor	University of Michigan	10 KW FM
WDET	Detroit	Wayne State University	10 KW FM
WDTR	Detroit	Detroit Board of Education	2 KW FM
WKAR	East Lansing	Michigan State University	5 KW AM
WKAR	East Lansing	Michigan State University	10 KW FM
WFBE	Flint	Flint Public Schools	1 KW FM
WHPR	Highland Park	School District of Highland Park	10 W FM
WMCR	Kalamazoo	Western Michigan University	10 KW FM
WOAK	Royal Oak	School District of City of Royal Oak	10 W FM

MINNESOTA (Region IV)

KUMD	Duluth	University of Minnesota	10 W FM
KUOM	Minneapolis	University of Minnesota	5 KW AM
WCAL	Northfield	St. Olaf College	10 KW AM

MISSOURI (Region V)

KCUR	Kansas City	University of Kansas City	360 W FM
KSLH	St. Louis	St. Louis Board of Education	3 KW FM

NEW JERSEY (Region I)

WFMU	East Orange	Upsala College	10 W FM
WBGO	Newark	Newark Board of Education	10 KW FM
WSOU	South Orange	Seton Hall University	1 KW FM

NEW MEXICO (Region V)

KANW	Albuquerque	Albuquerque Board of Education	350 W	FM

NEW YORK (Region I)

WAMC	Albany	Albany Medical College	3.5 KW	FM
WECW	Elmira	Elmira College	10 W	FM
WSHS	Floral Park	Sewanhaka High School	250 W	FM
WVHC	Hempstead	Hofstra College	10 W	FM
WICB	Ithaca	Ithaca College	10 W	FM
WBAI	New York	Pacifica Foundation	18 KW	FM
WFUV	New York	Fordham University	1 KW	FM
WKCR	New York	Columbia College	1.2 KW	FM
WNYC	New York	Municipal Broadcasting System	1 KW	AM
WNYC	New York	Municipal Broadcasting System	20 KW	FM
WNYE	New York	New York Board of Education	20 KW	FM
WSPE	Springville	Griffith Institute and Central School	10 W	FM
WAER	Syracuse	Syracuse University	1 KW	FM
WHAZ	Troy	Rensselaer Polytechnic Institute	1 KW	AM
WRPI	Troy	Rensselaer Polytechnic Institute	710 W	FM

NORTH CAROLINA (Region II)

WUNC	Chapel Hill	University of North Carolina	5 KW	FM
WGPS	Greensboro	Greensboro Public Schools	10 W	FM
WWWS	Greenville	East Carolina College	3.95 KW	FM
WHPS	High Point	High Point High School	10 W	FM

NORTH DAKOTA (Region IV)

KFJM	Grand Forks	University of North Dakota	1 KW	AM

OHIO (Region III)

WAPS	Akron	Akron Public Schools	1 KW	FM
WOUB	Athens	The Ohio University	250 W	AM
WOUB	Athens	The Ohio University	10 W	FM
WBGU	Bowling Green	Bowling Green State University	1 KW	FM
WBOE	Cleveland	Cleveland Board of Education	5 KW	FM
WCBE	Columbus	Board of Education City School District	3 KW	FM
WOSU	Columbus	Ohio State University	5 KW	AM
WOSU	Columbus	Ohio State University	3 KW	FM
WSLN	Delaware	Ohio Wesleyan University	10 W	FM
WKSU	Kent	Kent State University	10 W	FM
WMUB	Oxford	Miami University	250 W	FM
WTDS	Toledo	Toledo Public Schools	250 W	FM
WYSO	Yellow Springs	Antioch College	10 W	FM

OKLAHOMA (Region V)

WNAD	Norman	University of Oklahoma	1 KW	AM
WNAD	Norman	University of Oklahoma	3 KW	FM
KOKH	Oklahoma City	Oklahoma City Board of Education	3 KW	FM
KOSU	Stillwater	Oklahoma State University	380 W	FM
KWGS	Tulsa	University of Tulsa	3.2 KW	FM

OREGON (Region VI)

KOAC	Corvallis	Oregon State System of Higher Education	5 KW	AM
KRVM	Eugene	Eugene Public Schools	400 W	FM
KWAX	Eugene	University of Oregon	10 W	FM
KBPS	Portland	Portland Public Schools	250 W	AM

PENNSYLVANIA (Region I)

WSAJ	Grove City	Grove City College	100 W	AM
WHHS	Havertown	School District of Haverford Township	10 W	FM
WHYY	Philadelphia	Metropolitan Philadelphia Educational Radio	5.3 KW	FM

PENNSYLVANIA (Region I) continued

WPWT	Philadelphia	Philadelphia Wireless Technial Institute	250 W	FM
WRTI	Philadelphia	Temple University	10 W	FM
WXPN	Philadelphia	University of Pennsylvania	1 KW	FM
WDUQ	Pittsburgh	Duquesne University	1 KW	FM
WUSV	Scranton	University of Scranton	1.35 KW	FM
WDFM	University Park	Pennsylvania State University	250 W	FM

SOUTH CAROLINA (Region II)

WUSC	Columbia	University of South Carolina	10 W	FM

SOUTH DAKOTA (Region IV)

KUSD	Vermillion	University of South Dakota	1 KW	AM

TENNESSEE (Region II)

WUOT	Knoxville	University of Tennessee	10 KW	FM

TEXAS (Region V)

KUT	Austin	University of Texas	3 KW	FM
KVOF	El Paso	Texas Western College	10 W	FM
KUHF	Houston	University of Houston	3 KW	FM

UTAH (Region VI)

KVSC	Logan	Utah State University	10 W	FM

VIRGINIA (Region II)

WEMC	Harrisonburg	Eastern Mennonite College	10 W	FM
WMTI	Norfolk	Technical Institute of the College of William and Mary	3 KW	FM
WRFK	Richmond	Union Theological Seminary	3 KW	FM
WCWM	Williamsburg	College of William and Mary	10 W	FM

WASHINGTON (Region VI)

KWSC	Pullman	Washington State University	5 KW	AM
KUOW	Seattle	University of Washington	10 KW	FM
KTOY	Tacoma	Takoma Public Schools	1 KW	FM

WISCONSIN (Region III)

WLFM	Appleton	Lawrence College	3 KW	FM
WHA	Madison	University of Wisconsin	5 KW	AM
WHA	Madison	Wisconsin State Radio Council	3 KW	AM
WLBL	Auburndale	Wisconsin State Radio Council	5 KW	AM
WHSA	Brule	Wisconsin State Radio Council	10 KW	FM
WHKW	Chilton	Wisconsin State Radio Council	10 KW	FM
WHWC	Colfax	Wisconsin State Radio Council	10 KW	FM
WHAD	Delafield	Wisconsin State Radio Council	10 KW	FM
WHHI	Highland	Wisconsin State Radio Council	10 KW	FM
WHRM	Rib Mountain	Wisconsin State Radio Council	10 KW	FM
WHLA	West Salem	Wisconsin State Radio Council	7 1/2 KW	FM

STATES WITH NAEB RADIO STATIONS

Alabama	1 station 1 FM
California	7 stations 7 FM
Colorado	2 stations 2 FM
Florida	4 stations 4 FM
Georgia	1 station 1 FM
Illinois	9 stations 8 FM-1 AM
Indiana	12 stations 11 FM-1 AM
Iowa	7 stations 4 FM-3 AM
Kansas	7 stations 5 FM-2 AM
Kentucky	3 stations 3 FM
Louisiana	1 station 1 AM
Maryland	1 station 1 FM
Massachusetts	6 stations 6 FM
Michigan	9 stations 8 FM-1 AM
Minnesota	3 stations 1 FM-2 AM
Missouri	2 stations 2 FM
New Jersey	3 stations 3 FM
New Mexico	1 station 1 FM
New York	15 stations 13 FM-2 AM
North Carolina	4 stations 4 FM
North Dakota	1 station 1 AM
Ohio	13 stations 11 FM-2 AM
Oklahoma	5 stations 4 FM-1 AM
Oregon	4 stations 2 FM-2 AM
Pennsylvania	9 stations 8 FM-1 AM
South Carolina	1 station 1 FM
South Dakota	1 station 1 AM
Tennessee	1 station 1 FM
Texas	3 stations 3 FM
Utah	1 station 1 FM
Virginia	4 stations 4 FM
Washington	3 stations 2 FM-1 AM
Wisconsin	11 stations 9 FM-2 AM

STATES WITH NO NAEB RADIO STATIONS

Arizona
Arkansas
Connecticut
Delaware
Idaho
Maine
Mississippi
Montana
Nebraska
Nevada
New Hampshire
Rhode Island
Vermont
West Virginia
Wyoming

TOTAL NUMBER OF RADIO STATIONS — 155
FM — 131
AM — 24

CHANNELS FOR PROGRAM TRANSMISSION

II. CHANNELS FOR PROGRAM TRANSMISSION IN CONNECTION WITH RADIO BROADCASTING - Excepting Overseas Channels (Cont'd)

B. RATES (Cont'd)

1. Schedules AAA, AA, and A (Cont'd)

Note: The rates in (1)(a) and (1)(b) above will be applied for the period from the end of a daily contract period to the end of the additional hours of use or for the period from the start of the additional hours to the start of a daily contract period, if this results in lower charges.

c. Reversals in Direction of Transmission

(1) Schedule AAA

The direction of transmission of interexchange channel facilities furnished under Schedule AAA cannot be reversed. Additional facilities will be furnished for transmission in the opposite direction at Schedule AAA rates.

(2) Schedules AA and A

(a) Reversals in the direction of transmission in a channel will be made when the interexchange channel facilities in the sections involved are of the type which permit reversals. Type 1 reversals, in addition, are subject to the availability of the supplemental facilities required at each service and amplifier point in order to operate such reversals.

The charges set forth below include the reversal of the direction of transmission in local channels and the restoration to normal of both interexchange and local channels.

(I) Type 1 Reversals

Type 1 reversals are reversals furnished by means of special facilities. The direction of transmission is reversed or restored to normal within 15 seconds.

Type 1 reversals may be effected by the customer at his premises, or by the Telephone Company at its premises as directed by the customer, or jointly by the customer and the Telephone Company as directed by the customer.

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Issued: March 1, 1955

Effective: April 1, 1955

CHANNELS FOR PROGRAM TRANSMISSION

II. CHANNELS FOR PROGRAM TRANSMISSION IN CONNECTION WITH RADIO BROADCASTING - Excepting Overseas Channels (Cont'd)

B. RATES (Cont'd)

1. Schedules AAA, AA, and A (Cont'd)
    c. Reversals in Direction of Transmission (Cont'd)
        (2) Schedules AA and A (Cont'd)
            (a) (I) Type 1 Reversals (Cont'd)

When the reversal is to be effected wholly or in part by the customer, the customer will provide a suitable source of power to operate the control equipment provided by the Telephone Company at the premises of the customer.

The following charges apply:	Installation Charge	Monthly Charge	
Interexchange Channel Arranged for Reversals - per airline mile	-	$ .75	
Each Service Point Equipped for Operating Reversals, including one control and associated indicating lamps on station premises		75.00	
Extension of control, of indicating lamps, or of both, on same station premises			
First Extension	$150.00	10.00	
Each Additional Extension	75.00	5.00	
Remote Control Arrangement - to permit the control of reversal equipment from an exchange different from that in which the reversal equipment is located	60.00	16.00	(N)
(Rates as provided in Tariff F.C.C. No. 220 of this Company for low frequency channels are applicable for the remote control channel between exchanges)			(N)

Material omitted from this page now appears on Page 28AA.

CHANNELS FOR PROGRAM TRANSMISSION

II. CHANNELS FOR PROGRAM TRANSMISSION IN CONNECTION WITH RADIO BROADCASTING - Excepting Overseas Channels (Cont'd)

B. RATES (Cont'd)

1. Schedules AAA, AA, and A (Cont'd)
   - c. Reversals in Direction of Transmission (Cont'd)
     - (2) Schedules AA and A (Cont'd)
       - (a) (I) Type 1 Reversals (Cont'd)

Operating Charge	
When reversals are effected by the customer	No Charge
When reversals are effected by the Telephone Company - Per reversal, including restoral	$2.00
When reversals are effected jointly by the customer and the Telephone Company - Per reversal, including restoral	$1.00

When a service point is added on an occasional basis to an interexchange channel section of a Schedule AA or Schedule A network which is equipped for Type I reversals, as provided in A.10.b.(3) preceding, the excess mileage provided under Schedule BB or Schedule B is subject to an additional charge of $.02 per airline mile for the first hour or fraction thereof, and $.005 for each additional fifteen minutes consecutive with the initial period. When such service point is to be used for the transmission of programs to the network, it must be suitably equipped for operating reversals.

CHANNELS FOR PROGRAM TRANSMISSION

II. CHANNELS FOR PROGRAM TRANSMISSION IN CONNECTION WITH RADIO BROADCASTING - Excepting Overseas Channels (Cont'd)

B. RATES (Cont'd)

1. Schedules AAA, AA, and A (Cont'd)
   c. Reversals in Direction of Transmission (Cont'd)
      (2) Schedules AA and A (Cont'd)
         (a)(II) Type 2 Reversals

Type 2 reversals are reversals performed only by the Telephone Company. The release of the network by the customer is normally required for a period of from 15 minutes to 30 minutes prior to the time of the reversal and for a similar period following the reversal for the restoral to normal.

The following charge applies for each reversal (including restoral) and includes the switches required in reversing (including restoral) the station connection normally connected to the interexchange channel at each terminal.

Per airline mile of interexchange channel reversed	$ .03
Minimum charge	5.00

(b) Where reversals cannot be effected, additional facilities will be furnished for transmission in the opposite direction, at the rates for the schedule classification requested by the customer.

d. Local Channels

The provision of local channels is included in II.B.6.

e. Other Facilities and Services

The provision of other facilities and services is included in II.D.

NORTHEASTERN
EDUCATIONAL RADIO NETWORK

A STATUS REPORT ON INTERCONNECTION

As of May 1960, the Educational Radio Network consists of seven noncommercial, educational frequency modulation radio stations. The network operates by off-the-air relay from one station to the next; however at present interconnection is limited due to reception problems. This problem is now under attack and a solution is expected in the near future. A summary of the network as it exists today and some notes on reception problems follow.

Though it is not a member of the Educational Radio Network, the Canadian Broadcasting Corporation has expressed great interest in ERN and the possibility of program exchanges. In April, the CBC began separate programing for a network of three FM stations in Toronto, Ottawa, and Montreal. These stations are interconnected by means of a special 10,000 cycle wire line. It is hoped that interconnection with the CBC FM network may be accomplished by the end of this year. Either a new station in northern New York/Vermont or a wire line to Albany/New York City is required to accomplish this. WGBH Boston and WAMC Albany are exploring the possibilities for a new station in the north; WNYC New York City is now carrying CBC programing one night a week by means of a telephone line from Canada.

A one-way interconnection from Boston to Albany, New York, has been in successful operation for approximately two years. The distance between the two transmitters is 108 miles. The circuit has not been usable in the reverse direction—from Albany to Boston—due to adjacent-channel reception problems in Boston. WAMC Albany has applied to the FCC for permission to change its operating frequency in order to avoid this interference. In addition, WGBH Boston has filed an application with the FCC for permission to construct a new station at Amherst, Massachusetts, in the center of the state. This station will be able to relay programs to and from Boston and Albany without interference. It is anticipated that this station will begin broadcasting in September.

A station in Hartford, Connecticut, picks up the ERN programs from Albany and rebroadcasts them to its audience in the central Connecticut area. Unfortunately, this is a student-operated station which does not operate in the summer.

A new high-power station in south-central Connecticut would improve this situation and would cover the entire state of Connecticut. It would permit, in addition, a two-way interconnection with WNYC-FM New York City. The possibility of construction of a new station at Wesleyan University, Middletown, Connecticut, is now being actively investigated.

It is anticipated that the change in operating frequency by WAMC Albany (from 90.7 to 90.3) will permit relay broadcasting from that station to New York City. A New York City station, WFUV Fordham University, also is assigned to the present operating frequency of WAMC and has prevented reception from Albany during WFUV's broadcasting hours. It is possible to receive a good signal from WAMC at certain points in the city when WFUV is off the air.

WAMC Albany is able to receive all New York City FM stations with the exception of WNYC-FM—the ERN affiliate. If efforts to improve the receiving installation at Albany are not successful, it is possible that arrangements may be made with other New York City stations such as the Pacifica Foundation station, WBAI, and the new Riverside Church station, WRIV (not on the air yet). It is possible that either of these stations might carry ERN programs.

WNYC-FM is now relaying programs to WNTI Hackettstown, New Jersey, (Centennary College for Women). The programs are then relayed to WDFM at Pennsylvania State University via a commercial FM station (not shown on map on page 69) located midway between WNTI and WDFM.

WHYY-FM Philadelphia is presently prevented from relaying WNYC-FM due to adjacent channel interference from a Philadelphia station. WNYC-FM cannot receive WHYY-FM for the same reason. An intermediate relay station in New Jersey would solve this problem.

The American University, Washington, has filed an application to construct a new educational FM radio station. A meeting is scheduled for late May at this institution to explore the possibilities for forming a Southern Region ERN in the Baltimore-Washington-Virginia-North Carolina area.

Two new-type FM receivers are being investigated by WGBH. One receiver will permit reception of a station located adjacent to an interfering station on the next channel. The other receiver will select either the weaker or the stronger signal on the same channel (co-channel reception). A visit to the manufacturer is planned. It is hoped that the development of these new receivers will solve reception problems in certain critical areas and permit full interconnection of the Educational Radio Network.

Don Upham
5/21/60